NEWS IN BRIEF French plans bogged down

WHILE British plans to support its microelectronics industry are rapidly coming to fruition, French government plans have become bogged down. Only one part, known as SECIMOS, is to go ahead at the moment, according to French Industry Minister M Giraud. This calls for the encouragement of US companies to ally themselves with French

Though AMI, Harris, Mostek, National Semiconductor and Intel have been approached, no French company has yet shown any great interest.

Fruitless

WHILE Control Data is actively collaborating with the Jugoslav electronics enterprise Iskra on small computers, a similar agreement signed with Philips last year has borne no fruit. "The agreement has not been broken off by cither side." a Philips spokesman told Computer Weekly, "but so far nothing has been done."

Colourful order

ACCURATE pigment matching is achieved by many industries with the specialised systems produced by Instrumental Colour Systems of Newbury, Berks. The company has placed an in-ltial £300,000 order for microprocessor-based Digital Equipment PDP-11/03s around which the matching equipment is built. About 35 units are expected to be sold this year representing well over £500,000 business for DEC.

Sweet Systime

M22

TALLY

D

STOCKPORT confectioner Squirrel Horn has replaced its VRC with a 64K byte Systime

Your chance to command the Greek gods

Then enter the Othello contest being organised by systems consultants Zaus-Hermes in contion with Computer Weekly.

It is to be played out in London on July 7 and the first prize will be a hand-cut stone chess set depicting various Greek deities with Zeus-Hermes as King and Aphrodite as Queen. Lesser immortals are represented by other pieces and even if you are not a chess player

it's a prize worth having. Second prize will be a programmable calcu-

WOULD you like to command the Greek gods? Istor and the player in third place will receive a bottle of champagne. All contestants who get through the first round will be presented with the Othello board on which they win their

There already are about 40 entries and other intending competitors should apply for entry forms without delay to Maureen Chapman at Zeus-Hermes, Shropakire House, 2/10 Capper Street, London, WC1; Tel 01-323 0837. Only antries on the official form will be considered and priority will be given to players who

To while away the time between Othello games there will be plenty of other attractions including two terminals linked to CDC's Call 360 time sharing service on which a whole series of games, such as Moonlanding and various chess problems, can be played. There will also be more traditional tests of skill such as table tennis and darts.

It will be an absorbing evening so if you want to prove your prowess at Othello, apply for an entry form now.

First UK Multics goes Bath

THE first Honeywell Level 68/ DPS Multics system sold outside the US is to be installed at Bristol and will be shared by Bristol and Bath Universities.

The £2 million mainframe will become the basis of a new Avon Universities Computer Centre, which file stores and virtual and will support 60 interactive terminals in Bath and 150 in

As exclusively forecast (CW, November 24, 1977) Honeywell has simultaneously announced the Level 68/DPS Multics system for the UK market. Deliveries begin in the fourth quarter of this year. So far no more than two dozen Multics ystems have been installed. The Avon Universities Com-

puter Centre will complement the existing South West Universities Regional Computer Centre at Bath, which is equipped with an ICL 2980.

Originally developed at the Massachusetts Institute of Technology, and taken up by GE, Multics passed to Honeywell with GE's other computer businesses in 1970. It is best known for the "rings of protec-tion," implemented mainly in hardware which effectively isolate each user and application from all others. It is widely regarded as the most secure rdware and software system

available. However, the other major aim was to design a system to sup-3000 minicomputer based on a port large numbers of interactive users, and it was perfor-

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mance in transaction processing benchmarks which won the contract over the other finalists, CDC. IBM and DEC.

"Multics has an excellently consistent approach to interacmemory management are integrated is very good," Dr Alex Nichol, director of the Bath University Computer Centre told Computer Weekly. The South West Universities

- Bath, Bristol, Cardiff and Exeter — at present have a net-work of linked ICL System 4s, and the plan is to overlay this with an X25 packet-switched network. A network interface processor to link the old with the new is being developed on a GEC 4070 mini, and an X25 interface is being developed on the 2980 at Bath

Although some batch work will be run on Multics, the 2980 is designated as the batch

The next university due for new hardware is Cardiff, and it is planned that whatever the Welsh university chooses will be attached to the X25 network.

"To start with, we will concentrate mainly on the traditional university languages, For-tran and Basic, but we have visited the University of Southwest Louisiana, which has developed Pascal on Multics and we plan to put that up fairly soon," said Dr Nichol,

First user

NEW purpose-built distribu tion and service centre opened by Honeywell in Bracknell, Berkahke, has become the first user of the TPS 6/600 transaction processing system developed by sister company Honeywell Information Sys-



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service. Honeywell set up terminals at the Island Salling Club at Cowes, Isle of Wight which were linked online to GE's centre in Ohlo. These were used to provide race progress bullotins and the results of more than 30 classes competing. Quest of honour at the Management Management of the Management of classes competing. Quest of honour at the Honeywell dinner after the race was former Prime Minister Edward Heath, whose Morning Cloud came third in Division 1. He is seen here chatting with Miko Culyer, president-director-general of HB Network Information Services and Mrs Culyer.

GEC and Fairchild in talks on UK microelectronics firm

NEGOTIATIONS are still in progress between American semiconductor manufacturer, Fairchild, and the UK's General electric Co over the setting up of a new microelectronics company in the UK.

Although Fairchild would only confirm that it is holding talks with GEC "among others in Europe", and GEC would not comment, the indications are that a joint venture company could be formed soon.

Reports point to microcomputers and memories as the main product areas for the new company. Initial investment has been put at £50 million, a similar figure to that proposed by the National Enterprise Board's microelectronics company, with which the Fairchild-GEC venture would be in competition. GEC has no semiconductor

New US law would 'free' AT&T

LEGISLATION that would free eresta at present prevent it from

in a major draft Bill which would offering computer services, has completely overhaul US federal been proposed by two US Comcommunications law for the first gressmen who are also members time in its 44 year history, and of the House of Representatives replace the seven-man Federal Communications Subcommit Communications Communications. tee. The Legislation would also . with a five-man Communicate require both AT&T and GTE to . tions Regulatory Commission sell off their manufacturing into with more limited powers."



Scottish MPs want ICL base

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in Dundee A SUGGESTION by two Dundee MPs that any further expunsion by ICL should be ocated in Dundee has been acknowledged by the company, although it has added that there is "little prospect" of any manufacturing base being set up

there in the near future. The two MPs Peter Doig (Labour) and Gordon Wilson (Scottish Nationalist) pointed out ut a meeting with Scottish Minister of State, Gregor Mackenzie, that the Tayside Regional Council and five other Scottish local authorities had placed orders worth £6 million with

In reply, ICL has said that although it has no such manufacturing operations, talks did take place with the Scots on what could be done in the area at the time ICL was formed by the merger of ICT and English Elec-tric. However, these talks only led to the formation of ICL's Scottish development centre at Dalkeith.

The computer industry is not labour intensive in terms of manufacturing," said an ICL spokesman, "and there is little prospect of growth in our manufacturing employment

The two MPs also suggested during their meeting with the though it is one of the main distributors of intel parts in UK. Minister that he and his col-Fairchild, which in the f8 had lengues should steer to Scotland the proposed microelectronics chip sets introduced, now investment of about £50 million mainly sells the 3870, 8-bit single which the National Enterprise chip microcomputer as a second source to Mostek. Board is considering.

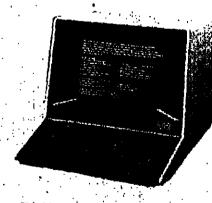
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At last—politicians wake up to micros

whether the UK could get 64K RAMs on the market in time to be com-

petitive. His scepticism seems to spell

doom for the NEB's plans should a

Tory government be returned at the

In his reply to Sir Keith, Varley said

the questions posed were either pre-

posterous or depressing, and he especially criticised the suggestion that Britain should not seek to develop

'wealth-generating.employment-

creating industries based on new

technology, but sit back and be con-

tent for the US and Japan to dominate

the market."

Variey is due to announce awards

under both the microelectronics and

microprocessor applications support

schemes this week (CW, February 16).

anticipated October election.

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Briefing

Survey of micro costs

ALTHOUGH the cost of micro processors is now less than £10 a soil, development costs necessary to ensure an end product with efficient and bug tree software can be as much as MASSO. This is one of the conchistons of a survey carried out by the Electrical Research Association for about 50 clients nthe UK and overseas

The survey showed that athough costs appeared high. the market potential for well. deeloped products was vast Details of the project are being issued to participant compales in four volumes, two of which have already been

2jowdown

PROFIES at IBM will be reduced by a slowdown in the rate of satight sales of hardware the year, according to charman frank Cary, Over the part two years, turninger from materials ides has risen Stirk, white routed income has grown out? 1.5 Cary also demical august a trons of a reorganisation within 11131. aid said that he antemated to when 1990, when he will be tell

inim asoning

Allen tare of the world minicotapeates seen, hes Hewlett-Package will obe atte. signed specification for the Mand-alune strend brent to tems market. The new provides & to built around a 18. tost erste i .. processor development of the control to be

Megyer

ME firm that provided structure ind northbrokers with rist water on Europena and rolls Edged Securities, Industrial Ly Migiream International

Indahl at Chrysler

Arching Amelahi user in the he management average to KAK Secury, where it only replace with 160 M 160/65. It will be the soul 470 V/6 In the Six the feet in at Kaye of Workwater (W. Jan 22).

legister call

the principality of the Finnish of the process of t approximate the second of the

Tories asked to abolish Insac export division THE second meeting of the Con- the other hand, defended govern-

n-fighting.

servative Computer Forum, a ment support, snying, "If you ment of hockbanch MPs (CV, June 1), was held last week to the same strongly apposing views were expressed.

The other hand, defended government in the same of the ment in the same of the s Corneltant Michael Johnson

trough attacked povernment offerts to promote the sales of willyware, less house it involved the Misteria ate telendineugati tie chestrates of the suppost substitute that the second of trease and followed that treas was distinguible follows the come it requires competitors in he appears to obtain the very penny ' He cinimust that cansult. tirms aspect better without

Mainbed Banker at CAP, on

the lack of venture capital partly on "City suspicion and ignorance of high technology," and claimed that, regarding the tax laws, almosful provisions for taxes would have killed intol at birth a

AFTER several years of benign

neglect, the computer and microelec-

tronics industries have been rediscov-

ered almost overnight by politicians of

all parties, but the imminent General

Election threatens to submerge the

lebate in a welter of party political

in the past week. Tory industry spokesman Sir Keith Joseph has writ-

ten to Industry Minister Eric Varley questioning the wisdom of the Natio-

nal Enterprise Board plan to set up an

integrated circuit company; Lord

Privy Scal Lord Peart delivered a ma-

jor speech on microelectronics; and

Minister of State for Industry Alan

Williams stressed the need for digital

Sir Keith's letter underlined opposi-

ion of the sector working party of the

National Economic Development Office to the NEB plan, and asked

technology in telecommunications.

this country through their limite sion on plough back. Bemosning red land, Bean Barker pointed out the lost opportunities in "costage in-dustry" production of hardware and entiwers, stylined by plan-ning restrictions, etc. He said, "The only way for Britain to get a 20th century computer industry is to give small business a 18th century expitalist environment."

area for support, and the new area of Despite the fact that a Tory victory multi-application circuits. in any future election is likely to mean Turn to page 18 the end of government money for the Gamma sets up Series 1 firm

development schemes, the Electronic

Components Sector Working Party of

the National Economic Development

Office has asked the Department of

Industry for much more money to

support UK microelectronics (CW,

May 4). In a report to the Department,

the working party calls for a fun-damental change in the Dol's original plan to support multi-application

A total investment of about £240

million is sought, with £80 million of

that coming from the Dol. This is more

than three times higher than the or-

iginal sums suggested by the Department (CW January 19). The funds

would be split between support for

special circuits - the Dol's original

standard" circuits.

UNDERLINING the threat strategy is the COS/1 Cobol posed by the IBM Series 1 to the raditional minicomputer supphers, Garmaa Associates, of Nottingham, hitherto special- February 16). Gamma has ex-

Mosnwhile IBM has announced significant anhancements to the mini, including plans for a Cubol compiler, and extensions to main and disc

Key element in Gamma's

against deterioration of kit by

corrosion due to air con-

operating system developed by Compudata Systems Inc of Westport, Connecticut (CW. remains in business systems on Digital Equipment hardware, is a stabilishing a new company within the group to market, software for about £9,000 with Series I systems.

"We have sold over 100 DEC systems and expect to go on selling them in large numbers." Dr George Coggan, managing director of Gamma, emphasised

to Computer Weekly. "We felt we needed Series 1 to et access to a number of large IBM users who refuse to buy hardware from any other com-

significant extension to the minicomputer business that we cannot afford to ignore it."

There are no OEM discounts on Series 1, which means that companies like Gamma cannot make money by selling the hardware. Nevertheless the company alms for sales of at lenst 50 systems in the next 18

COS/1 is an interactive multi task, multi-user operating system which fits into 26 32Kbytes, supports local and remote terminals and a background batch stream. Compudata has

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effective measured package off. rustry that but been introduced. top 10, 1 in anniberene bie ifemannich from its suctomers, timbermotive to the Lagte Stm Count hangemeeting beautations little the place in factor worker for the rent and claimer, and and and and engagement the the appropriate the state of the second st the anchoraged and open while experience es to additional by prives for the

the galate de decient as 16.1, audcommen who have purchased TREES THE PARTY BEEN AND THEFT OF THE STREET more foreign county-release where while is concerned for damage by it I.'s present in the auditomies tarif.

It'l, emphasises that under the blan all faulty equipment will be replaced with new kit.

June 1), IBM has decided to pull

The plan automatically pro-vide: cover against remote ter-nomals and data links at un-

respecting the Dispersion IBM pulls out of Nigeria

from India this month (CW, the company intends to sell test of Nigeria rather than subent to government directives to
self 40% of the local subsidiary to
Nigerian nationals. ligeriun nationals. As in Indonesia, where IBM rien territory.

FOLLOWING Its withdrawal also closed down its subsidiary,

business activities to a locally-

COMPUTER WEEKLY'S INSIDE NEWS

Typic amount treatment my stope to the first profits are presented and the front are profits are profi THE small business system hab

ctaining to speak for the pro-feminate has been officially com-plesed and the first chalmen of the institute of Data Processing Management, Heville Taylor, Op Spot People in the News Disry Dates Computastus report and

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JESN 0010-4787

This month marks the tenth anniversary of the shooting of Andy Warhol by Valerie Solanas, for whom SCUM stood for Society for Cutting Up Men. In this Guest Computerview,

people are chronically and massively deprived of jobs, the same moods of alienated frustration as those expressed in Valerie Solanas' SCUM

Machine Intelligence Unit at Edin- Manifesto could build up quickly burgh University, warns that, when with terrorism, racial slaughter and war not excluded in some social circumstances. SCUM would then stand for the Society for Cutting Up

Beware SCUM—the Society for **Cutting Up Machine-makers**

But the joke has disturbing

overtones. Valerie Solanas' fan-

tasy of replacing male persons

by machines acquires a hint of feasibility — but females are

equally vulnerable. A recent

Times article described a word

processor as "The four thousand

pound typist-substitute that will

Where do we stand as com-

puter people? We started it,

The situation is more acute

because there are not one but

two problems building up: (1)

ob-destruction, (2) the need to

fight overseas competition both

by modernising our own plant

and by developing automation

Yet (2) seems to aggravate (1).

Well may Hines say "There will

All that a computer man can

do is to see if his own professio-

nal skill can be brought to bear

on some sector of the problem.

be no easy, wand-waving solu-

systems for sale overseas.

soon pay for itself."

referring to the latest oil slick. cent references to the mush-The acronym SCUM was originally coined in New York by Unimation (CW, May 11). The the tragic paranoid Valerie job application form shown has been filled in on behalf of a Un-Solanas who, on June 3, 1968, imate robot. The corporation

For her, SCUM stood for puts it out as a promotion gag. Society for Cutting Up Men. With brilliant intensity her SCUM Manifesto propounded the bold idea of exterminating the male of the human species, thus freeing the world's women to develop their own destinies. Her idea was to fill the gap with

My mind went back to poor Valerie's diatribe while reading Colin Hines' The Chips are Down (25p from 40 James Street, London, W.1) published recently by Earth Resources Research Ltd. I realised that a new kind of craziness may one day be sparked off - not man-hating out machine-hating. In seven terse and sombre pages the author warns that computerinduced mass unemployment may attain disaster proportions in Britain, and certainly will do so if a major national effort to analyse and cope is not

Hines argues that it is the microprocessor which is suddenly turning dreams into threatening reality.

For example, contributing to "the human interface", so as to What happens when people make obscure brute-force comare chronically and massively deprived of jobs? My reading of history is that the very same putations more comprehensible to the machine's supervisors, is clearly one of the more conmoods of alienated frustration structive directions. Allied to as those expressed in SCUM can that, the whole area of build up quite quickly with tercomputer-aided education and rorism, mass hooliganism, racial training acquires a new, and esslaughter, and war not excluded pecially beneficial, significance. n some social circumstances, as One must sympathise with inal outlets. SCUM this time union pressures for further The job application form on behalf of a Unimate robot

will stand for Society for Cutting Up Machine-makers. Luddism never yet turned back the industrial clock. So other responses will have to be found to such facts as the fol-

 Micro - automation has already shattered the Swiss ● In 1970-75 National Cash Register reduced its manufac-

turing workforce by more than . In 1970-76 US Western Electric's manufacturing force drop-ped from 39,200 to 19,000. A 75% cutback is additionally expected in fault-finding, maintenance,

 Similar trends are now apparent in the service industsupermarkets, in the garment trade, in offices, in design shops

and else where. Overall, unemployment in Britain is projected at the level of 5 million by 1990.

Hines also takes note of the growing impact of the repro-grammable robot. Private-

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Oceanic Rentals For most company managers, fascination with computers is imited to complaints and demands for explanations.
Although it is not unusual for
the DP department to be the last
to be informed of any new company development, it nevertheless has to be ready to accommodate the new application the
week after next. Far from Portable printers – built in acoustic coupler making close encounters, most

None the less, I prefer the "fourplus one" day to the "four-day" day educational release at employers' expense. Such a scheme would generate work for the education industry, which itself can absorb with benefit indefinite amounts of automation to augment, not displace.

If we computer men do not concern ourselves about the good and evil we sow, then a day may dawn when we do indeed have to watch out for SCUM!

'SCUM Manifesto" by Valerie Solanas, New York: Olympia Press, 1968 (paperback).

-APPLICATION FOR EMPLOYMENT...

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SPECIAL QUALIFICATION Strong (100 lb. load), untiring 24 hours por day, learn fast, never forget except on command, no wage increase demands, accurate to 0.05" throughout aphore of

HISTORY OF ACCIDENTS OR SERIOUS ILLNESS Suffered from Parkinson's Disease (since corrected). lost hand (since replaced), lost memory (restored by cassette), hemorrhaged (sutured and

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FOCUS

management college. It was ment passing through the col-lege expressed a keen interest in computing applications — an involvement apparently denied them in their own organisation.
The fasqination with DP ex-

ended to close involvement with linear programming and computer based marketing. Perhaps these particular managers are a special breed, yet to be released into the average com-

as far removed from the DP

SELDOM does a week go by in the computer Press without DP management being on the receiving end of some heavy "stick". Computer Weekly (June and Italian Itali apparently random articles combined to knock the DP

In another article, the DP First to wield the cudgels was manager is blamed for proan article on a certain general ducing too much information. Current management informamade clear that the organisers tion systems are resulting in a lar parcel comes wrapped in held a very poor view of DP disappointing lack of success, layers of technical jargon and hame for this linhappy state techniques. of information affairs is, natu-rally, that of the DP department. In this case, not even the benefit of any doubt is given. It is the information specialist from the DP team who is the villain. The basis of the threat is that DP and company teams speak in dif-

ferent languages. The answer to all this confusion is, of course, better liaison and communication. It is not the DPM who is out of touch; it is

more often the company management Maybethe college could be encouraged to run specific courses for DP managaspecific courses for DP managament. The curriculum could provide insights into simulated board-room sessions and group policy discussions. Finding out what life at the top is all about could be fun and perhaps even rewarding, Even better dould be a session or two of exposing company management to real life computing.

Contrary to popular company

management belief, the DP teams do consider themselves as being part and parcel of the organisation, even if their particu-

well aware that its involveme it does not take the services of a temputer to inform the DP teams that their level of action is all too often, in a remote and random mode.

has room for improvement and

chess bet nearly **Over** The 10-year period of David

Ten-year

Levy's computer chess bet expires at the end of August, in August, 1968, Levy started a bet, now standing at £1,250, that no computer program would win a match against him within 10 years.

The final match which will be automated the automated the

determine the outcome of the bet will be played during the last few days of August. The exact venues have not yet been decided but Holland, Canada and the US are the most likely countries to host the event. There may need to be more

than one match and they may take place at different locations. A warm-up game is planned for July 25 against a program which will most likely run the Cyber 176 at CDC's plant at Arden Hills, Minneapoli Arrangements for this have still to be confirmed.

Computer fraud conference

A CONFERENCE on computer fraud and its prevention will be held at the Hilton Hotel, London WI on July 4. It is subtitled The Protection of Computer Use from Plagiarism and Abuse.

Speakers will include Colin Tapper, Fellow Tutor in Law at Magdalen College, Oxford; Bil Dunn, UK managing director of Pansophic Systems UK; and Michael J. Comer, corporate security co-ordinator of Esso.

Further details can be obtained from the organisers, European Study Conference Ltd, Kirby House, 31 High Street East, Uppingham, Rutland, Leks LEIS OPY, tel. 057 282 2711.

Gamma sets up Series 1 firm

From front page

already installed eight systems and has another 100 copies of COS/1 on order. Gamma gets its own Series I in September: IBM has now announced its

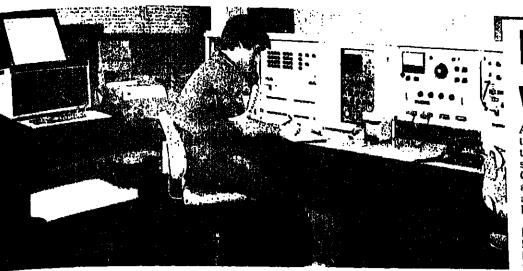
own Cobol compiler for delivery in the third quarter of 1979. which will be compatible with 370 Cobol and costs £2,365. A new processor, the E model, with faster, high density memory has been added. A disc subsystem with capac-

itles ranging from 58 to 258 Megabytes will be available next spring, as will a floppy-disc nagazine unit which takes 23 diskettes. Software enhancements include facilities to exchange data with 370 mainframes from the 135 upwards. Facility which allows TSO users to offload editing from the mainframe on to Series 1, A two-channel switch has also been added, enabling Series input-output channels to be switched between two proces-

Ten years ago.

COMPUTER WEEKLY

TEDDY Tirling chose a computer motif to decorate some of his creations which coincided with the first ever Open Wimbledon. Computing power intended primarily for software development in data communications was installed in a new wing at English Electric's Kidegroya factory. Plans were being made by the London branch of the BCS to provide members with a series of meeting points in the suburbs. Following a recommendation, made by the Hotel and Catering Economic Development Council, groups of hotels linked commercially or geographically were to initial computerised reservation systems. A distance was to be established within the National Physical Laboratory at Taddington.



EPSS consists of Ferranti Argus 700-based packet-switching exchanges in London, Manchester and Glasgow.
Our picture shows the network service centre at London exchange.

lel ring managed by small, iden-

tical software kernels resident

on each machine. These are

written in Concurrent Pascal.

Only the interface between each

computer and the ring must be

specialised for the needs of the

Demos systems software is

written as a single program.

Once compiled, an independent

system generation program

allocates its components among

the individual computers for

particular type of device used.

Scicon and NPL develop system based on micros

The system will be particu-

ities are taking place in parallel. each part of the simulated sys-

larly suitable for large scale

Fast file access will be possible

based on a chain of microcomputers that can be extended. smost indefinitely, is being developed by Scicon in conjunction with the National Physical Laboratory. The project is being supported by a £30,000 grant from the Advanced Computer Technology Projects fund and a further (30,000 from Scicon.

It is planned to have a prototype of the system, known as Demos, ready next year and fust application areas are expected to be in real time control. transaction processing and

The basis of Demos is a high capacity communications link capable of connecting up to 250.

loading. In this way a program can be reloaded on larger or smaller configurations without change. The systems software can be written to support particular applications, and application programs can be written in a different real time language.

Newcastle Council to stay with ICL AFTER putting the order out to

lender, Newcastle upon Tyne Council has decided to stay with ICL and ordered an ICL 2970 in preference to an HUM 3031 system. The 2970 is to the delivered

It will replace the present 1904S, and provide the power and facilities needed to insule ment an integrated financial, land, property, personnel and housing management system. probably using ICL's 113MS

dalabase management system. Running under VME/B, the 25 Mbyte system will also support a communications network that will feature 39 cash receipting terminals handling

Electronic music festival

mosts of 40 modern corre-pease will be featured in the 1974 Ediaburgh Featural of Electronia Music, to he held extracts Music, to he held extract Music, to he held extract Music and Rep-tantonic Feature with the Ediaburgh Pentium. The Electronic Music Featural is speasond by the Experiment-tic Society (Edinburgh) is bi-speasition with Hadio Forth Atta Council.

Tricket for the six concerts by small for the Edwingship from the Edwindship for the Edwingship for 188 Fight Burest, Royal land. Edwinnigh.



housing rents in 26 offices; un tc1, 7502 terminal processor supporting eight display terminds for program development, another 7502 handling lumunisation and vaccination

INTERRUPT

record inquiries, and various

other terminals in schools and

the engineer's department.

SOME years ago a large compuny installed its first computer. It had bided its time to ensure that the equipment really had the necessary throughput capacity, with efficient software and systems and adequate peripherals.

The first and biggest job was sales invoicing, 10,000 invoices a day to 250,000 delivery points. A considerable customer muster file was set up, and after only 135 program trials, the system d able to undate this large and complex file. All went well for a month

then disaster. Everything stop-ped for a store parity failure. Re-run — parity failure, again; change tape deck — parity failure; read the offending record manually, which happened to be that for Elstree Rural District Council - parity failure. So en gineers descended from far and wide and laboured for three days and nights. And the coriclusion? A design fault triggered by the bit pattern of that particular

It is worth noting that the computer that had been so carefully chosen was the third of a new and very advanced senes

Morak It's and enough to bide your time, if you are still a plou-

O This proof a 55 Incorrect price when he M. C. Handock of Back-femalistic Horse

EPSS open day shows UK

up with their counterparts over-

via the big experimental US

ARPA network to a computer in

third network, Satnet, was con-

ducted from the Los Angeles

computer which involved con-

nections via the Intelsat IV

satellite to computers in Boston, Oslo and London. Satnet is an

experimental network with

ground stations in Goonhilly.

Cornwall, in Sweden, and in

Virginia, US, and the purpose of

the test was to measure the

amount of time which data

three-network link, demonstrations of a new low-cost graphics ystem, and access to the BBC Ceclax text display system over a computer network were among the features of the first

tablishing a link through EPSS EPSS Users Open Day last week.
The advent of X25 networks has tended to push EPSS, the Los Angeles. An experiment on a Post Office's Experimental Packet-Switched Service, into the background, but the demonstrations made it clear that

transmitted on Satnet spends in each ground station. Dale Sutcliffe of the Atlas Rutherford Division. Laboratory, demonstrated that cket-switched networks could e used for graphics work by ful real time simulations will using EPSS to run a demonstration of a graphics package, applications where many activalso be possible by modelling

Graphic Option Controller. .GOC is a microprocessor-

A DRAMATIC transatiantic research institutions are right based raster scan display generator which enables an orlinary alphanumeric VDU to be used for graphics work. It was Steve Treadwell, of University developed at Surrey University College, London, demonstrated network interconnection by es-

and is marketed by Sigma Electronic Systems. in the demonstration it was used in conjunction with a GEC 4070 computer installed at Rutherford and linked to Lon-

don via EPSS. The National Physical Laboratory showed a number o demonstrations involving connection of EPSS to its own inhouse network. Among the demonstrations was network access to the BBC's broadcast Ceefax teletext system for put ting up text on a TV screen. NPL has developed an interface which takes the decoded signal from a standard teletext receiver and translates it into a character

Open day demonstrations were given at five centres: Glasgow University, Rutherford Laboratory, Harwell, National Computing Centre, Manchester, University College London and Sperry Univac, London.

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Nationalist exiles

IN conversation the other day with Gerry Fisher, ebullient ex-president of the BCS, I discovered that he is also president of the London branch of the Scottish National Party.

I have spent several days now struggling to get my mind ound the idea that there could actually be a London branch of the Scottish National Party. I keep imagining that next I will hear of a Cairo branch of the World Zionist Organisation.

I suppose it's just one of those numberless contradictions that seem, in an - exchange.

endearing way, to characterise these amazing islands on which we live.

The newly formed conference company, Informa-tion Studies Ltd has taken up residence in the grandly-titled Regal House in Chorleywood, Herts. But for the time being they are without a phono, as the Post Office is having trouble getting them lines quickly. Which is strange, as Regal House used to be the local telephone

mental Sound X, and it consists of a box that just sits there and makes noises. You can select white noise, random surf effects, the sound of single waves breaking, light rain, a steady downpour, or a waterfall. You can even, if you wish, switch it off.

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your choice

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what you need at Hammacher

Schlemmer, the New York

emporium of things for The

It is an electronic sound

conditioner, called Environ-

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All this is meant to aid relaxation, or concentration at work, and only costs \$129.95.

Do not scoff at Yankee ingenuity-it makes money. In some American juke boxes you can put in a quarter and choose. a record that gives you two and a half minutes of silence.



Computing Centre, as is David Firnberg, is that you get to present bouquets to award-winning operators. Firnberg is seen above with the finalists in Wordplex's Operator of the Year competition for word processing typists.

Mrs Lesley Draper won the award for her dactylographic expertise, and for writing the following poem: glide through the words now with the greatest of ease. As they form on the screen at a touch of the keys,

I can change them, arrange them, save or delete, Form letters from phrases . . . Wordplexing's so neat! I am sure you will agree that Pam Ayres must look to her

By the way, there is no truth in the rumour that David Firnberg

is to judge the Miss World contest next year.

Don't panic—take a more flexible attitude to work

attended the recent 2900 Club Conference on the "Economic impact of computing in Europe over the next five years" was liable to be assailed by a powerful sense of deja vu.

It was not that the subjects were outdated. There was frequent mention of microprocessors and distributed and word processing and two speakers discussed in some depth the economics of minis versus mainframes.

The cause of the feeling one had been here before was the continued presence of the spectre of widespread unemployment that pervaded similar gatherings 20 years ago.

The prophets of the middle 1950s were certain that the rapidly widening use of computers would signal the wholesale disappearance of office

In particular, banks and Insurance companies - both pioneers of office automation and its most obvious beneficiaries would, they were convinced. soon be operating with skeleton

What happened, as we now know, was that the nature of many office jobs changed. Many men and women who had spent

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Maintenance Service "

The People Who Maintein

Back in the mid-1950s, the prophets of doom were convinced that computers would put masses of office workers on the dole. But what happened was that the nature of many office jobs changed. At the 2900 Club Conference, says LAURA TATHAM, speakers and dele-

retrained to edit or prepare input data or, later, operate terminals. Although in individual organisations natural wastage was allowed to take its toll, there was

little if any overall decrease in the number of jobs. Increased office employment was, in large measure, a direct alt of increased use of computers. More and more computers were installed by organisations which, once content to use the methods that served their ancestors, realised these

new faster moving environ-The demand for information processing has now become insatiable. There is currently a serious famine of office workers n London and other urban centres, and of computer people

iad become inadequate in the

At the 2900 Club Conference. speakers and delegates in their

their lives in clerical work were turn raised cries of alarm on behalf of those now working in the production industries.

Union and management representatives agreed, not only that it is impossible to stem the tide of progress but that successful exploitation of new technology is a necessity for economic survival.

What, then, they asked, is to become of the army of workers who will be displaced by microprocessor-driven robots?
It seems highly improbable

that the pattern of development in industry will exactly parallel that in the office world. The ratio of blue to white collar workers has been in decline in most countries for some years.

Whether or not the halt in this migration that has occurred in France, as noted in the recent report to that country's President, "Rapport sur l'informatisation de la Société" by Simon Nora and Alain Minc, is a straw

n the wind, remains to be seen. Furthermore, the saturation point for many kinds of goods — assuming these are produced in current volumes and that Third World countries remain impoverished — seems to be at. least in sight.

There is a school of thought fundamental need for personthat affirms history can teach us to-person nothing. But is this true? One activities. thing we can certainly learn from retrospection is that the speed of technological develop-

speed of technological development will always far outpace human ability to appreciate and exploit its full potential.

The first word processor. Autotypist, appeared in the US in 1936 (though not in the UK until the 1950s). For years it and similar machines were used almost exclusively, at least in this country, to give added impact to such items as charitable appeals duming letters

by scarcity of staff.

industries. While to ignore such prophecies would be irresponsible, here she urges us to avoid taking panic measures that could lead to ill-judged and perhaps irrevocable decisions.

like minutes and reports.

to change, an almost unthink-

able event, there are still for-

long introduction of automa-

unskilled human being.
Another powerful deterrent is

the size of the sums already in-

vested in conventional plant and

equipment and the astronomical

cost of retooling for new tech-

There is a third, less tangible

but probably more intractable

and persistent deterrent to

widespread automation in any

sphere, That is human nature

to-person contact in many

It was, for instance, less economic stringency than recognition that physical prox-imity raises productivity that

ltself. There is, apparently,

gates were voicing alarm on behalf of

those now working in the production

This shortage is in Itself often due to the unwillingness of girls to suffer the intolerable

boredom of endlessly retyping amended versions of document Factory managers and workers are at least as conservative as their office counterparts. Even were there an abrupt reversal of traditional resistance

note speech at the conference, is the importance of preserving a sense of perspective. The social and economic effects of the inmidable obstacles to the headdustrial Revolution were enormous. They were also spread over more than a century. Robot technology is by no

means as highly developed as a few outstanding and widely publicised examples suggest. It will be a long time yet before designers achieve the degree of flexibility inherent in even an

hold repairs, to name but a few.

.. It has often been suggested that most of us will have to master several different kinds of expertise in the span of our working life.:

The need to educate Britons at

ments shout future develop-ments smell-strongly of panic. This is dangerous it will intenthis country to give added impact to such items as charitable appeals, dumning letters and order acknowledgments. These had previously been duplicated not hand-typed.

Today, word processing is be programmers would work better in control or replace the human typist in some areas. Significantly, though, this move their offices both disproved this and to develop more effective by scarcity of staff.

rypothesis.

(The women who work for F in these endeaviours.

staff the highly automated Paris Metro to some extent, because vandalism ran rampant in unnanned stations.

made, not only at the 2900 Club Conference but by many other thinking people, in print and on the air, would be irresponsible. Clearly enormous changes are on the way. The question is -

What history shows, as Basil Cousins emphasised in his key-

The only aspect on which production-oriented society.

Why should the implications perhaps, for a few transitional years? There is already substan-tial unsatisfied demand for such services as medical and dental care, provision of leisure activities, good as distinct from ex-

ferent case: for them the choice may often be solitary working or intellectual stagnation.)

It has been necessary to re-To ignore the prophecies

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Neither Imagination nor the most sophisticated techniques we have yet been able to devise is capable of predicting in any detail the shape of things to

there seems to be widespread agreement is that we are moving lowards a service- rather than a . of this be unemployment except,

caused sweat shop owners (and a few, shrewd managers of data prep departments) to crowd as of serving others in any many machines and operators as mail space, Other examples abound.

Many companies have forgone ments shout future developments dictation systems be

equip themselves to use the techniques and ment to sit tight and do nothing.

capabilities offered by computer technology.

"The government to sit tight and do nothing." society could be faced with disaster.

This was the main thesis of a talk by in the way and start stating which industry Conservative MP Inn Lloyd, when speaking may do one thing and which industry may at the "Computers and Peripherals - 1980 and Beyond" conference at the US Embassy, Lloyd, who is chairman of the House of

Commons Science Sub-Committee, opened the computer seminar with a talk entitled The Political Control of the Silicon Revolution," but was himself dubious that any such control should be exerted.

In fact he suggested that as there was a great danger of the wrong political decisions being made due to a lack of awareness of the "There are those who think the test

"There are those who think the techno-NEWS IN BRIEF Fujitsu gives Philips to build details of 'most powerful system' 750,000 items a day at Rambouillet

passion and flair for technology."

"The government must not promote false

confidence," said Lloyd. "They must not get

not. If this does occur, people will not

tolerate it; they will react irrationally or

even possibly violently. It is profoundly

important that they learn more about tech-

nology. The Japanese have realised this, as

have the Americans, who have always had a

But one of the difficulties in achieving

such an admirable state of affairs was that

there were two schools of thought, both

THIS year Philips plans to build 2,300 P800 series minicomputers at its Rambouillet plant, near Paris. Half of the output will be fully configured minis for use in process control and other applications; the remainder will be shipped to Sweden for incorporation into PTS 6000 banking

2,300 minis

Four in five of the minis made at Rambouillet go for export, while imports of components for their manufacture amount to only 30% of their value.

PO policy change

WHEN a Post Office policy change takes effect in July, itwill no longer be necessary to rent an additional exchange line for each tensed line modern The Past Office considers the moderns are reliable councils to downhout a remote test facility for PO engineers

Prime time

TO provide a time sharing bureau service for structural and civil engineers, a Prime field System has been installed by Faber Computer Operations of St Albans, Herts.

Division may close

THE plan for Cincinnati Milacron to sell us commercial systems division to (51) International, a company set up by Milacron employees (CW, May 18) has foundered because greement could not be reached on price. Cinconnati Molacron's usiness systems division, set up to win a wider market for the dalcomputers, which the Ohiobased company builds to control to be closed down.

idizian order

RDERED 18 months ago, two NCR Criterion 8570 mainfrances ave been installed at the Belsian Pinance Ministry, where they will replace two NCR Cenury 200s at a lower cos! Appli Allons include income, pro- will be to specify a ran berty, company and mutor standard function types which issuiton and are being deveoped in Cobol 74. The order was won in competition with NCR. CILHE, Univac and JHM.

MS profits

PRANCIAL results published by MDS for his financial year add April 30, 1978, include billion and net 10713 of \$6,259,000, compared Historia of \$146 million and Historia of the previous year.

filetar approval

SOME details of the world's on the hardware on which they are run, raises the question of why Fujitsu should bother to

develop its own version of MVS.

The reason is that it is

Yen, down from 18,000 million

Yen last year, and representing a

mengre 3.5% of turnover. For the

current year, l'ujitsu is projec-

ting further strong advance in

sales, looking for 447,000 million

Yen, on which it hopes to make 14,000 million Yen in pre-tax

macro facilities.
The group which has already

met twice, is likely to affiliate to

the BCS Information Retrieval

specialist group. The latter is

trast with the new group which will consider information retrie-

val more generally, including database and data analysis sys-

The group has set itself the objective of publishing a report during 1979. This will cover

relevant aspects of the user-computer interface and will also

categorise the languages cur-rently available, distinguishing for example those which are

syntax driven from those using

prompt/response techniques.

redominantly concerned with

iographical systems, in con-

apparently illegal in Japan for a Fujitsu now says that the Muser to run an IBM operating 200 CPU is an enhanced version system on a non-IBM machine. of the M-190, which is effectively an Amdahl 470V/6 with 10 extra Fuitsu's partner in the M series, Hitachi, has not yet aninstructions, and that multiprocessor versions of the M-200 nounced its own forthcoming supercomputer, which is are configured with each proclaimed to be even more powercessor having its own memory. ful than the M-200, and will be rather than all memory being added to Itel's AS series as the common The M-200 is available AS/7. However, it appears that with up to four processors and a the Japanese trade and industry theoretical maximum main ministry MITI has vetoed the memory capacity of 64 unofficial name of M-210 that Megabytes However, Fujitsu Hitachi wanted for the machine. says that the capacity of the ● Unaudited figures from registers limits this to a practical

Fujitsu for the year to March maximum of 32 Megabytes. In maximum configuration, 1978 indicate that turnover has risen sharply and now stands at the M-200, which will be availalmost exactly £1,000 million at able in Europe from Siemens, is the current rate of exchange for claimed to offer five times the power of an IBM 3033 uniprothe Yen. The turnover of 387,400 million Yen shows an 18,3% advance over last year's 327,969 Turitar also says that its new million Yeu. Fujitsu recorded a large-scale OSIV F1 operating pre-tax profit of 13,500 million

system is "object and sourcecode compatible with programs written to run under IBM's MVS, implying that such programs can be transferred to a machine running under OSIV/ F4 without recompliation.

most powerful general purpose computer, the Fujitsu M-200

have been clarified by the com-

The fact that IBM operating systems are made available by the company without restriction

UK group to study online query languages can in general be constructed later, for example by using

A NEW group has been formed in the UK to study online query

tanguages
The Chairman, Roger Tagg, of Scienn, says that there are already about 100 such languages available on various computers, and with no standard syntax or style in existence. there is an urgent need for a framework for future developmersts. ..

One aim of the group's work any language should contain. This would then act as checklist for those designing or evalu-ating query facilities. A standard syntax, Tagg

pointed out, would fall outside the scope of this work. Users the overless should choose the priscise form of dialogues, which

'Prime targets in a strike'

CHIVERNMENT computer centhe particularly those involved in revenue collecting, would be prime targets in strike situamigroprocessor based tions. This view was out forward tions. The parties as a comment of the in approval for linking to who inflied a comment on the bijoin begins networks. The Chil Service Department review of computers in central government that had been attributed to

the association (CW, June 8).

He said the CPSA agreed i He said the CPSA agreed in the main with the view put for ward in the report. "The use of selective strike action has been, and will continue to be, one of the major effective means of applying pressure to the applying pressure to the applying the said."

'Adapt to computers or face disaster'—MP warns

at past events and point out that society has taken them in its stride despite famine.

world war, and other slumps. "Then there is the apocalyptic view where people say that we are approaching an 'event horizon" — a discernible black hole in technological space. They believe that we have little time to come to terms with the problems. . . . I am inclined to this latter

Other speakers at the seminar included John McNulty, managing director of Modular Technology, who described the advances we may see in computer peripherals during the 1980s; and Gordon Scarrott, manager of ICL's research and advanced development centre, who outlined the "Effects of Merging Logic and Memory in the 80s."



LLOYD . . . "better for the govern-ment to sit tight and do nothing."

NCR's latest sorter can handle up to

A LOW-COST electronic teller used for passbooks and printing tem for reading and sorting cheques and other documents are the two latest additions to NCR's Inancial range.
The NCR 2251 is a micro-

based teller terminal that can operate as a stand-alone system or be upgraded for online communications and data capture

it can be programmed via its keyboard or, if the terminal is perating in an online mode, prooperating in an online mode, pro-grams can be loaded from a cen-tral computer or cassette unit. In addition to standard tellor-transaction functions, the 2251

offers the obility to colculate int erest, and it can perform positive proof of deposit at the teller sta-tion and automatically produce

The inserted forms station

includes a 90-column matrix

locument sorter is a modula system that can be tallored to handle between 60,000 and 750,000 items per day.

expanded with optional features.

A dual MICR/OCR, reading acilities with logic to reduce

well for Level 62 is called TPS and, according to Honeywell, it The NCR 6780 cheque and occupies less memory than most available packages while offering faster terminal response

It begins with a 24-pocket system that can process 1,200 items a minute, but this can be

released by NCR early next year and this will reduce the subsyssystem as well as providing mul

petitor for the IBM System 34 and the bottom end of the projected E Series from IBM. A sorter-controller will be The 200 Megabyte disc drive introduced for Level 62 is part of

a new family of disc stores called Large Storage Module Drives, LSMD, manufactured by Magnetic Peripherals Inc. This is the firm in which Honeywell has a misreads and item rejects by large minority share, the majority being held by Control doing a digit-by-digit comparis will also be released in 1979.

Honeywell

gives 50%

boost to

Level 62

THE average system perfor

mance of Honeywell Level 62

computers has been boosted by

about 50% with the introduction

of a respecified processor, 200

Megabyte disc drives, transac-

tion processing system and 16K

bit memory chips. These have

enabled the maximum main

nemory size to be doubled to

At the same time, Honeywell

has announced the biggest Level 62 order yet in the UK. This has

been placed by NEI Mechanical

Engineering which is decentral-ising its data processing opera-tions by replacing an IBM 370/ 145 at Gateshead with seven

Level 62s. These will be installed

at locations all over the country.

system announced by Honey-

The boosted transaction pro

cessing capability of Level 62

should make it a stronger com-

The transaction processing

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extended to include 6,500 electronics design

party-goer searching on a well-lit street. A passer-by starts to help him to find the watch he has lost. After half an hour, the passer by asks: "Where exactly did you lose the watch?" "In that dark alley to he left," says the party-goer. Exasperated, the passer-by lemands: "Well, what are we wasting our time looking for it under this street lamp for?" Our tipsy friend replies, with frightening logic: "Because

it's lighter here! We computer specialists seem, consistently, to apply the intoxicated logic of the party-goer to our projects. We set, as clear measurable goals, only those things which are simple and obvious o measure. like finished date. costs, speed and space.

important to the success of the project, like reliability, maintainability, portability, ease of user learning and recoverability of files, for example, will typically be unspecified. Or at least the specifications will be so unclearly specified as to be

For example, a bank real time project, where the hardware supplier was committed to writing 200 terminal subroutines, had this maintainability specification: 'Our maintenance programmers shall be able to maintain the programs." I would ask: If they find a bug that's stopping the online system within two weeks, is the system meeting the maintainability specification?

Jerry Weinberg created the

which goes something like this: If you don't care about the reliability goal of a project, you can meet any other goal of the project. Which is another way of saying that if you don't care to measure whether the system works properly, you can deliver it yesterday. If, however, you want it to work perfectly,

In the real world, you and your user are going to have to reach a compromise. And that will require clear, quantitative and practically measurable definitions of the reliability concept.

your user may have to wait

I tend to think of a computer project as a boat with some random holes in it. Some holes are below the waterline. If we don't plug

them all, we risk sinking. If we only manage to plug most of them, we are going to have to do a lot of work getting rid of the water in the boat. If we plug holes above the water-line ("non-critical goals"), instead of the ones below, we may sink while we are plugging the wrong "goals". In my experience we are all

guilty of plugging holes above the waterline, and stuffing pieces of bread into some of the critical holes. As an example of the latter. I'll bet that few readers ever define a measurable goal (not a technique which you hope will get you some result) for maintainability of programs. I'll bet that you have been stuffing breadcrumbs into that hole (structured programming, modularity,

comments, indentation,



documentation).

At all computer installations I have visited I have never been shown details of any past or present project, where all critical goals are stated in quantified and measurable form.

I find this state of affairs incredible. Data processing is management without objectives. In some areas of system quality we are in such a poor state that we don't even know a realistic level of an objective because we have never even measured the levels at previous projects.

Enough of this criticism. have been as guilty as anyone. But I have tried to mend my ways. And I find great interest and ability among my clients and course participants for the exercise of setting formal quantified goals for projects. It takes one to six hours of work to pin down eight to 16 goal

projects already under way out you should start now to **practise** it for new projects How else can the manager

manage the project? We fill out a "metrics matrix" as one colleague dubbed it. Along the vertical axis we list the dozen or so most critical high level goals. If you have more, you are probably listing too-detailed goals: this we do later by "éxploding" high level goals ("security") into more detailed goals (file security, fire

Then along the horizontal axis we fill out parameters describing our critical goals measure to be used, planned quantitative level, worst acceptable case level, best imaginable case level priority, "more important than other goal," and finally a reference to the authority documentation for claiming his goal and its levels to

As Lord Kelvin once said, i you can't quantify your meagre and unsatisfactory kind. We find we can satis factorily quantify all critical goal areas, and then use them to design the system. Try it

PROGRAMMER

Advantages of a file handling library

component of programming that most people tend to use manufacturers' routines. But a home made file handling and record handling library can offer a number of advantages, particularly where the standard facilities are limited or awkward

HOTES

Consequently Programmer Notes presents some ideas on a do-it-yourself I/O library.

The routines should be written in assembler and stored in a separate system library to be linked in with applications programs at LOAD time.

The routines likely to be used most often are those dealing with opening and closing files Suggested formats are OPEN (unit number, file-name/ password/owner-accountname, location, access method, new or old, READ/WRITE privileges, expiry date, status); the CLOSE routine parameters will be a subset of those with an additional retain or destroy parameter.

The file name may be supplied by JCL, by the user or operator in response to a program request, taken from a file, or even generated by the program.

However supplied, the name will be in text format and needs checking for illegal characters. Remember too that the user's terminal or card deck may be a valid file "name" default and should be allowed.

Passwords need similar validation and any account numbers should be checked This helps to see whether a user is trying to create a file in an account other than the one hols

Although location of the file will default to primary disc storage, users should be allowed to request a tape or other secondary storage. The identifiers should be checked for basic validity, and any operator messages produced. The access method parameter

should allow for the file to be created as, or an existing one be used as - keyed, random or sequential. When a file is to be read it may be possible to treat a keyed file as sequential. This means that when the OPEN or CLOSE request has been satisfied by the system, the file's access method type should be checked back with the initial

System performance aid in Shadow II update

ments to Altergo's Shadow II TP
monitor include two major new
facilities developed by the company in the US, Energetic marketing in North America, including the opening of eight regional offices earlier this year, has already given the product around 70 US users.

One of the new facilities is a tool for predicting online system performance. Based on a model of the proposed system, the

Puzzier

TRY this one in your head. A climber walks up a mountain slope at 114 mph, and down again at 425 mph, taking six hours in all for the double journey. How many miles does he walk? See page 45 for solution.

such parameters as resource utilisation and response time.

The other facility, Online Mapping, already has some 20 users in the US. Based on a special map file, which stores map definitions, the subsystem is claimed to result in an average 30 per cent saving in overall programming and testing time for TP applications.

Fully interactive, Online Mapping eliminates the need to compile map definition programs, and checks for incorrect spacifications, flagging the er-

The system enables an existing map to be recalled to the screen, from where it can be easily modified or used as the basis for creating a new map. A chargeable option, Online Mapping costs £2,400

EDITED BY PETER HEWITT

Basic Timesharing reveals details of access protection feature

TWO system software packages and an able for updating all linked files loped in the US, to some extent overlap method. It is designed for use by endonline accounting system for Basic automatically when a transaction is Timeshuring's BTI 4000 machines are entered being marketed in the UK by Cara The system handles a comprehensive Consulting. At the same time, Basic range of functions including general Timesharing has revealed a unique pro-ledger, order entry, bill of materials, job Timeshating has a count feature which protects costing, and invoicing. Little batch pronstalled vendor's software from un-

Cara's Midas system, developed in the USby DLM Enterprises, is an integrated Offered in the US largely through accounting and inventory control bureaux, the system has about 70 US package. Based on a network of direct users.

cessing is performed, except for example such functions as producing statements.

access chained liles, the system is not. Cara's other two offerings, also deve-

report generator, incorporates a high retrieving stored data. Both packages level command language and searching and sorting facilities. Like IBM's Brads (Software File, June 15) the system includes a data dictionary controlling

application program access to files. The other application development software without allowing access to the tool, Mars (Multiple Access Retrieval source code.

In their capabilities and are sold there in users as well as application program-Minds, a database manager and creating files and also updating and

Real time

monitor

for MVS

real time monitor for IBM'

VS1 and MVS operating systems is the latest Value Con

puting product to be released in the UK by RTZ Computer Ser-

SMT (Systems Managem

fool) provides real-time dis-

permitting systems program-mers and those responsible for production to fine-tune the sys-

tem. A unique early-warnin mechanism is also provide

job time-outs and allows the times to be reset. SMT is priced

at £2,800.

nat notifies the user of pending

plays of resource utilisation

provide for multiple concurrent access Said to be unique, the proprietary account feature on the BTI 4000 allows software suppliers to licence the use of

System) provides file handling facilities The protection is provided by the based on an indexed sequential access account structure of the operating sys-

cannot be accessed without supplying a high-level password, which is held in the operating system software.

The technique is feasible because Basic Timesharing permits only very restricted access to its system software, forbidding examination of the operating system either in core or on disc

An interesting aspect of the facility is that it still permits the software vendor dial-up access to the system, so that he can maintain and update the package

Portability key to NAG for minis

super computer.

of ANSI Fortran.

tion last year for the Prime 300 (Software File, August 18, 1977) the Numerical Algorithms Group Fortran library has now been made available on several

further minicomputers. Perhaps of most interest will be versions for two Digital Equipment machines: the PDP-If range and the new VAX 11 780. Also offered are implementations on Harris equipment and the Rank Xerox 530.

Yet to be completed but our rently under validation, are versions for GFC 4070 and 4080 hardware, the ModComp IV. Nord 10 and 50 systems, and

These strategies had enabled NAG to avoid the major libraries, he noted.

rewriting of software found necessary in other numercial The team had been particu-

implementation for the Cray I

Dr Brian Ford, the director of

the Group, pointed out that the

remarkable portability of the

software was in part due to the

use of a carefully selected subset

Also significant was the isola-

tion, in the source code, of ex-

plicit parameters defining es-

sential numerical features of the

Time sharing system that he characteristics of the most widely-used devices. The pro-Offers 'TSO for OS/VS1 gram has five main functions circuit and stability analysis;

scribed as an implementation of TSO for OS/VST has been adopted for marketing by the European Software Company (Software Life, hone 5) A horses tem. Tone 3, was developed by Tune Software Corp of Anaheim, Colifornia and cure on

IBM 370-135s and upwards Tone-3 is in general function ally equivalent to TSCL officing similar facilities for interactive program development as well as apporting systems programning and operations activities is terminal consuland language and command procussion are

TSO compatible. An interesting architectural

clumnation of user swapping. In TSO, (which is available only under OS, MVT, SVS, and MVS) imposes swapping on paging, resulting in a somewhat greater overhead.

Another factor claimed to mga ove throughput is the use of BTAM rather than TCAM.

The storage requirements of the system depend on the number of active partitions. According to the company, between 10 and 15 users could typically be supported by a one Megabyte partition when running in full virtual mode. Tone-3 will be available in the UK for

VAX had been completed in only one man-month Despite the concurrence of new hardware, a new operating system, and a new Fortran comoller, all 345 library routines had

sensitivity and analysis; optimi

sation; and the generation of

data for two-dimensional error

popular finite element analysis

system, enhances areas in-

luding element hundling, ana-

lysis capabilities, input, output and graphics processing. Systems Professional, also

known as Sys Pro, is a library of

Revision 3 of Ansys, the

mplementation. Conversion

and validation of the library

generally took around three

nan-months, but transfer to the

been implemented on VAX rirtually without any difficulty.

LUCS library updates

RECENT additions to LUCS' software library include a program for optimising microwave circuit designs, an upgraded version of Ansys, and a set of 30 US programs for structural engineers. All are

iffered as part of the bureau's interactive service. Designed to analyse the performance of complex high frequency circuitry. Compact features a built-in databank describing the existing functions should be a VME/K bureau service.

TPS Care will inevitably be a higher level product than cur-

vide additional code in any areas

VME interest with order

facilities in VME/K, schedule

WITH an order for an ICL 2950 handled by the operating sys system, Telecomputing has con-firmed its commitment to deveOne of the first task One of the first tasks on th lop TP software for VME/K and new machine will be to validate VME/B users. The new system the basic transaction processing will be used initially for the de-

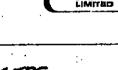
Telecomputing confirms

velopment of TPS Care under to appear in version KSV-16 of VME/K (CW, October 6, 1977). the operating system next The primary aim of TPS Care is to ensure that existing TPS This release should coincide users enjoy complete software with the delivery of the 2950 to portability from 1900, 2903, and Felecomputing's Oxford head-2904 systems to the 2900 en-

quarters, also planned for March, 1979. In support of this goal, the First deliveries of TPS Care company has set three specific for VME/K are expected around objectives: to present an unautumn 1979 and will be folchanged user terminal interface; lowed by a version for use with to provide the same user pro-VME/B. A common TP interface gramming interface; and to prohas been promised by ICL for

the two operating systems, where the standard operating notes the company. system falls short of current TPS In addition to catering for the development of TPS Care, which will be written in SFL, the new rent TPS versions, as many of machine will be used to provide

MEMO



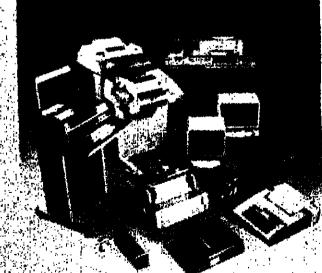
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software developed in the US to meet the needs of a company in the areas of structural analysis and project management. Widely used in the US, it includes the well-known Stress

Cobol for

A SECOND Cohol compiler has been produced in the US for IBM's Series I. Claimed to meet full Level 2 ANSI 1974 standards. the software was developed by Royal International Systems, of Tustin, California and is scheluled for release in October.

Included in the package are a report writer and a soft/merge routine Writer in a proprietary language, the compiler runs in a 28K partition, generating code executable under the RPS. operating system.

HALF-YEAR turnover of 6405,000 has been achieved by Systemsolve (Compliter Ser-vices), representing a growth of 60 per cent over the same period 60 per cent over the same period last year. The company recently with a second contract to implement a pension fund system, this time for the 50,000 members of the Port Employers and Registered Dock Wirkers scheme. The cred Dock Wirkers scheme. The system will be run on an ICL System 10.

TRAINING OFFICERS Subject CORAL 66 COURSES X

The next Systems Designers CORAL 66 training course is on * 7th August 1978 Famborough, Hards.

One week intensive course produces effective CORN programmers through the use of

Deads from Tony Golbour

- 1

By Bernard Allen

The reason for this is that if a job's priority i

set beneath the system default, all subsequen

work will immediately be processed before it

leaving the job concerned on the input queue for

The resetting of work via the console is

scorned at some installations where it is argued

that the work has already been scheduled in order to get the best 'mix'. But the practice is

an excessive length of lime.

Contracts for the modems are expected to be placed in about September this year.

Meanwhile a stop-gap 4,800 bps service is operating in the City of London, where 50% of the data transmission handled by the Post Office is centred. Called Datel 4832 it is based on the Racal-Milgo MPS 48 modem and will operate until early next year when the full 4800 bps ser-vice based on the Post Office's Modem 11 is scheduled to begin.

This will be enhanced in mid-1979 by a further model of Modem 11 which will support multi-drop lines.

The Post Office's X25 data network is expected to be in service in 1979 or 1980, although it has not yet had formal appro-

processing

Just three of the witel features in the June DATA PROCESSING.
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Midland users consider setting up standby installation

from the other Mug member companies.

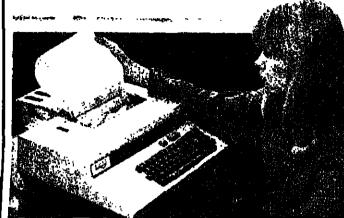
specifically for providing IBM standby Midland Users Group, Mug, an associa- standby centre is currently being dis- gram development. tion of big IBM users in the Birmingham

Dunlop, Pirelli, Tube Investments, Lucas Renault and several other major IBM

users in the Paris area. When not running John Leighfield, systems director of BL work for Mug members whose systems facilities is being considered by the Cars, told Computer Weekly that the had gone down it could be used for pro-

Mug sees itself as a high level pressure cussed by himself and his counterparts group and is taken seriously by IBM, The centre would be funded jointly by Mug members which include BL Cars. He said that the centre would probably whose UK boss, Eddle Nixon, has alread be similar to one set up in France by addressed one of the group's meetings. whose UK boss, Eddie Nixon, has already Gene Amdahl, the boss of IBM's arch

rival, has also spoken at a Mug meeting. BL Cars, which is now concentrating most of its mainframe processing power at its Redditch cars data centre, already has mutual agreements with Lucas and Pirelli to provide standby facilities. Last Christmas Bl. Cars made use of IBM's bureau centre at Warwick, after one of its 370/158s at Longbridge went down.



Key information about an organisation's telephone traffic, like unauthorised overseas calls, can be printed out as a call is made on this terminal. It forms part of the Real Time Generator package introduced by Minster Automation as an enhancement to its Tiger telephone accounting system. Each time a call is made Tiger records the extension number, the number dialied, the time the call started and the time of completion. If not wanted immediately this information is recorded on magnetic tape for analysis later on a mainframe computer. Existing Tiger users include Rank Xerox, British Steel, Ronco Vickers, Beachams, Ford Motor Co and Honeywell.

Data Processing

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CHEQUES / P. D. SHOULD BE MADE PAYABLE TO IPC BUSINESS PRESELTD

Leyland threat to **IBM** at Warwick

THE teleprocessing bureau operation set up by IBM at Warwick may soon be facing competition from the centre opened by BL (formerly Leyland) Cars at nearby Redditch (CW, June 22). Chris Chiles, group DP manager of BL Cars, told Computer Weekly that the data processing capacity of the Redditch centre would be expanded by about 30 per cent a year over the next few years and that the intention was to sel bureau services to completely separate outside organisations.

This would be in addition to the processing already being carried out for more than 30 BL Cars sites all over the UK.

Although BL Cars does not actively market bureau services at the moment it already carries out some processing for nonrelated companies on a limited scale and also provides a number of services for about 300 dis-

These services already include supplying distributors with bin price lists and early next year BL Cars will introduce a batch stock control service. Distributors using this will be equipped with IBM 3741 key-to-diskette data collection stations.

Future developments could include offering services to distributors of the other manufacturers' cars and this would put the Redditch centre in direct competition with bureaux already in this business.

By the end of this year the Redditch centre will have two 370/145s, two 370/158s and a 3033, but Chiles said that the 158s would be replaced next year by a 3033 or by an Amdahi machine. This could be an Amdahl 470 V/7, the biggest machine that Amdahl builds and the most powerful general purpose computer currently avail-

Study of word processing

V JOINT team from the Civil Service and the Office Machinery Sector Working Party of Neddy is to make a fact-finding trip to the US this

A range of Installations will be studied in the US government and in private companies, both successes and failures, to glean information to aid the development of the UK word processing

Three representatives from ANOTHER two-day seminar on the Sector Working Party will be on the team, with one each from the management services division of the Civil Service Department, the Central Computer Agency and the Stationery

NEWS IN BRIEF

of terminals

INTELLIGENT data capture is the main application area for the PDT-11 family of programmable display terminals introduced by Digital Equipment. The three members of the family, the PDT-11/110, 11/130 and 11/150 all incorporate DEC's LSI-II microcomputer, which is compatible with DEC's PDP-11 minicomputers. All three terminals are built

around a new video terminal

132-column lines. In additio

provision for a local printer.

Unline system

the VT100, which can display

the 11/130 has two cartridge

TWO Prime 300 computers have been ordered by the Building Research Establishment, a

government-funded body which

carries out research into the

construction industry. The first

will be used by the Establish-

ment's library and the Building

Research Advisory Service for

online information retrieval of

the Establishment's records, and

the other will be used for com-

the problems of interconnecting

logic devices is to be held by CAM Consultants on July 10 and

11. Subjects to be covered at the

St Albans venue include cross

talk, power supply decoupling

puter graphics.

CAM seminar

tape drives while the 11/150 has floppy disc storage. There is also

flowcharts and sample print

"The main problem is actually gotting the documentation be-fore the gustive date A method that works fairly well is to draw up a detailed dummy set of operating instructions and circulate copies as a standard."

On the occasion described, a standards, cancelled it.

The point I was trying to make was that if the job had been

manager, he said: "At first I thought he was someone to be trusted but at the last staff appraisal he told me that I was doing really well and would be upgraded in the salary scale in

operations staff had relevant the near future. However, by

room is organised."

Don't try to guess what the programmer meant

is an old operators' morto and it is still largely true, particularly for testing work. If you don't try to enforce installation standards they will quickly be typoced

That is the view of Rob Stevenson, who has some 19 years' operations experience. and writes in cospenies to an Op-Spot on operations documents: tion (CW, May In). He continues: "Surely all ex-

erienced operators know that to try to guess what a program. mer really meant is a sure way to waste hours of machine time and overwrite files."

Says Stevenson, "Unfortunstely your example is not a good one as it concerns testing work Documentation for testing is never a great problem because it is not needed in any great depth All that is required is a wellesigned run sheet and some allation rules about resting.

The real documentation problem is with live work, which will still be running after the and programmier have He could then have Some to join a contract agency.
This is when the extra informs: warned him not to do it again.

are planning to expand your vitally-

important order processing and stock control system, you cannot afford problems: Take Nabisco - famous for Shredded Wheat. They wanted to

further sophisticate their computing facilities by establishing an integrated communications network, with autodial at the master station and automatic answer at the remote sites. Their depot staff were not computer-trained

"We had a power fallure and all our data was lost." - "Someone has removed a diskette with files leftopen." -- "We have very little office space available." - "We do not want to learn another, non-standard language." - "Can we overlap input/ output operations?" - "We may need up to 60K of memory." - "Our people have never used a computer

The Nixdorf Computer 8820 Terminal

one manufacturer had a machine that could provide a satisfactory solution to all those problems and more

> Nixdorf is the manufacturer and the machine is the Nixdorf 8820 . intelligent terminal.

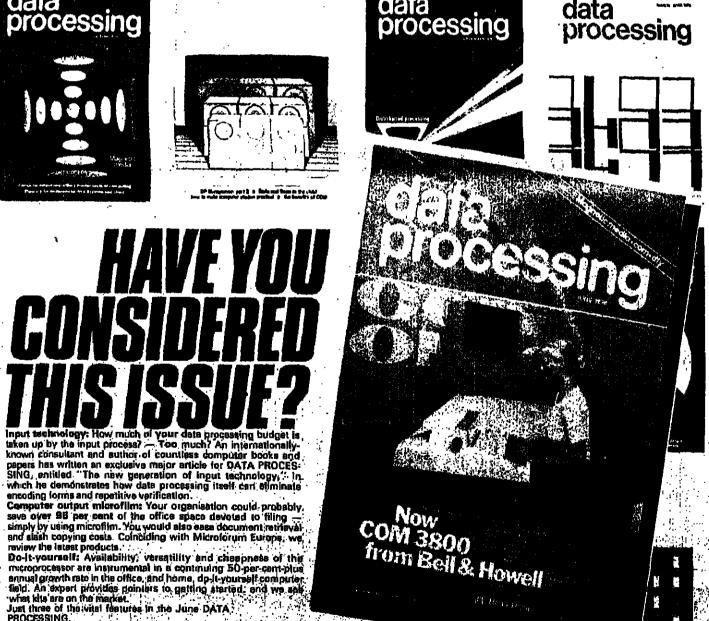
So Nabisco purchased 10 Nixdorf 8820s and the entire system went live at all depots on April 1st. They are now looking to develop the system still further.

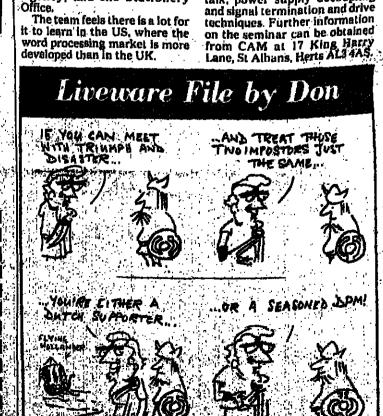


For further details of the Nixdorf .8820 and the Nabisco network, tele-phone Roger Cordrey on 01-572 311

NIXDORF COMPUTER

Nixdorf Computer Ltd., Hounslow Centre Lampton Road, Hounslow, Middlesex.





don't have a clue'

became involved in training

them informally as well as car-

rying out the function for which

were on a higher grade than I."

he was paid — operating.

given little consideration.

obvious I had no chance."

cal competence, and for taking

Of the DP manager, he said:

"As far as I can make out, the DP

manager is a nice person, but it is obvious that he has no idea of

the hardware, software, or the

manner in which the computer

Talking of the operations

his hard-won skills for granted.

use of, but the fact is rarely recognised - with the result that the staff do not get their just reward in terms of pay and

OP SPOT

The great problem is that senfor management seems to be incapable of differentiating between operators who are competent technically, and those ho are not.

This is the opinion of a senior operator who contacted me in response to an Op Spot of a few weeks ago, which reported on the DPMA meeting concerning the relationship between operations staff and DP management.

He told me "I started in operations with a company which provided me with an excellent grounding in computing. They sent me on a series of courses and also arranged for a lot of 'hands-on' training to be

carried out at the site." He stayed with the company for about two years, but left because he worked "an odd shift system" and he wanted something less tiring.

He continued, "I went along to an agency and they told me of a company which was in the process of converting from ICL. kit to that on which I was trained, IBM. Subsequently 1 went along for an interview and got the position of sentor opera-

layouts, etc is required.

 Stevenson makes some interesting comments, but his criticism of the example I gave is

programmer used the job stream dedicated to testing work to submit a library compression job to the system. The job soon ex-ceeded the time allocated to testing work at that site with the result that the operator, in accordance with the installation

accompanied by documentation which included data as to its function, the operator could have let it run to its conclusion.

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'Most managers

"I did much to help the staff at the site, he believes that the get acquainted with the system, time has come for the and that included those who implementation of some means of measuring the knowledge of

After he had been at the site for about a year, one of the operations staff left the company and the position of shift leader became vacant. He applied for the job, but was "So much for all that training

> "Also we must have something which will give a true indication of an operator's knowledge and be accepted as such by DP managers. At present the majority of them haven't a clue about what goes on in the com-puter room."

sent to the DP manager and it "Lazy, not interested in the

operations staff.

carried out on a regular basis and the operator concerned should be shown the report made out by the operations manager and allowed to make a

of staff," he said ruefully, adding "I had an interview for the job, with the operations manager and the DP manager, and it was He blames the DP manager and the operations manager for failing to appreciate his techni-

However, when rescheduling work in this contained such comments as manner, the operator should ensure that he resets jobs to priorities which are higher than the work and unimaginative." system default. This is achieved by use of the

As a result of his experiences Barclays relocation unpopular

"Staff appraisals should be

perations staff. By the middle of next year, the bank's sites at Harrow Road, Harlesden, and in the Totten-

THIS week's hint relates to the resetting of jobs

In order to make the best practical use of the

system resources, and so aid throughput, the

console operator should be constantly aware of

the facility which is available to reset job

According to members of Barclays staff, there has been a

ham Court Road will have been

relocated to a new centre in-

HINT OF THE WEEK

in the IBM OS/VS environment.

ollowing OS RESET command:

THE intentions of Barclays

Bank for two of its London

computer centres do not seem to

coincide with the career plans of

a considerable number of its

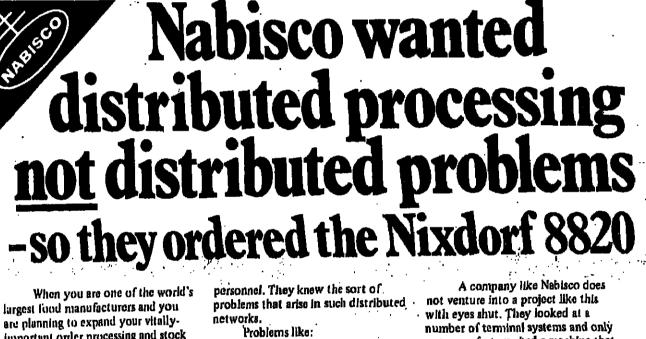
number of benefits to staff who steady flow of leavers since the proposed move was announced last October. The figure is said to are prepared to make the move

be about three a month. The bank has offered a

Beware when resetting job priority

to Gloucester. These include 21/2% mortgage for persons of 21 years and over.

Operators often complain that nobady listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your nions and ideas on all matters relating to computer operation opinions and ideas on all matters relating to computer Operations
Your letters should be sent to Op Spot, Computer Weekly, Dorset
House, Stamford Street, London SE1 9LU. Telephone calls are
equally welcome and Bernard can be contacted directly on 01-251
8035.



at Geneva

exhibition

puters and Microprocessors and five versions have been pro-exhibition and Conference held duced to meet a variety of appli-

panies taking part were an Intel 8085A microprocessor

exhibiting in their roles as together with the AMD 9511 for

cations.

on show at the international

Microcomputers, Minicom-

at the Palais des Exposition in

Geneva last week. Although

some new products were being

demonstrated, most of the com-

agents or distributors for UK

What was new from European

sources, however, was of con-

siderable interest. Two new de-

velopments, one from Norwegian-based Mycron, and

and US manufacturers.

Edited by Martin Banks

A high standard

from London N of Thames

in the bright sunshine as the competitors toiled in the heat, at the London, North of Thames heat of Computastars held at the Willesden Stadium last week. A record entry this one, with

some 31 men's and 12 ladies' teams taking part in a whole range of events in the hope of qualifying for the final. The day was concluded with a series of gruelling steeplechase races, and at the end of it all

Patrick Kamara, an operator with the Midland Bank, and Gayle May of Case, emerged as the Computastars of the area. Patrick is a natural athlete, as found out when I finally



Wheelerhouse (above), a tape librarian at BOC Datasolve, after her win in the ladies' jump-ups. (Below), Computatas of Tomor-row — enthusiastic participation in

the bar after the day's exertions. Apparently not very tired, he

"The steeplechase was the hardest, coming at the end of the day, but I didn't find the other events too tiring. I don't do much sport, although I play football occasionally.

Unfortunately I was unable to find Gayle when the competition finished, but having seen her romp home in the sprints, I feel sure that she didn't even stop at the end of the steeplechase and ran all the way home!

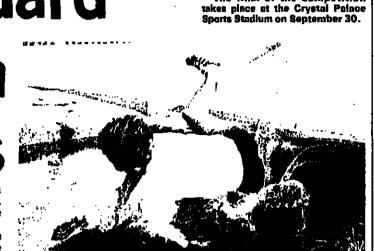
The men's team competition was won by the team from Gordon and Gotch with 141 points, with London Transport on 1321/2 points in second place. The team

from EMI won the men's plate.
In the ladles' competition,
Allied Suppliers were top with 01/2 points and the team from Case finished in the runners-up spot with 761/2 points.

Some of the athletes who took part in the heat appeared to be of a high standard. A fact confirmed by Gordon Cairns, of John Goldsmith Computer Services, who said, "Some of the teams have been training quite hard for the heats, and the attitude seems to be getting more serious as the competition

Obviously satisfied with the way the day went, Cairns added, "We have learnt a lot since the first couple of meetings, and today we kept things moving so that the competitors didn't have to wait about too long between

"In the press-ups event, for example, each person goes on until he reaches his limit as



Final heat

John Goldsmith Computer Ser-

The final of the competition





The water jump defeated most competitors in the steeplechase, including (above and left) Peter Cheatle of Allied Suppliers, who managed to struggle out nevertheless and proved a clear winner in



Girl Technician of the Year Award

AN annual award to the Girl Tech-COMPUTASTARS is organised by nician of the Year is to be made jointly by the Caroline Hasiett Memorial Trust and the Institution f Electrical and Electronic Tech The last regional heat will be for eams from the Midlands and will nician Engineers. The amount of the award is to be \$250, with no condibe staged at the Alexander Sports Stadium, Perry Park, Birmingham on Sunday, July 9, beginning at

ions as to how it is to be spent. The aim of the award is to draw ittention to electrical and electronic engineering as a career for women. The winner will be a girl who has not only undergone technical training out has shown that she can hold

down a responsible job.

The closing date for nominations is October 1. Further details can be had from Joan Ashton, 1EETE, 2 Savoy Hill, London WC2R 0BS. Tel: 01-836 3357.

David Redhouse, previously a management consultant with Harrison Computer Services, has been appointed to the board.

Tony Golborn of Systems Designers Ltd has moved into seles, as sales executive, from the advanced software group in which he was a

Also Marsden, distribution con-ultant at British Road Services, has been appointed group consultancy manager, which includes functions such as development and application f computer techniques to transport

Peter Easton and David Morton have been appointed associate directors of CMG (City of London). Both were previously employed by CMG, Easton as senior systems and programming consultant, and Mor-ton as project leader of the Payfact

Pamela Goodman of VIP Consultants International, previously hoad of administration, has been appointed chief executive and senior ssociate with total responsibility or the overall operation of the busi-

Paul Methyen has rejoined RTZ Computer Services, where until 1977 he was commercial systems manager and technical manager for the Value systems, as systems development manager. In the intervening period he has been DP manager with Iorman Miller.

Wallace Avery has been appointed area manager, bank operations in NCR's finance and government division. He was previously a district manager in bank operations.

Chris McCarthy, senior sales executive with Cara Data Processing in Ireland, has been promoted to head of sales, computer sales divi-

Raj Prasad has joined Systemsolve as a consultant in the Northern office, from Gemini where he was a senior programmer. David Sands, previously a project leader with the University of London, becomes a consultant in Sunbury-on-Thames with Systemsolve, and Michael Rigby joins the company as a senior analyst/programmer from John

John Morgan has joined J. M. Factors as paper products manager, from Wiggins Teape where he was technical adviser to the IDEM marteting department.

Tony Crossley, previously print area manager with ICL, has joined Software Sciences Comprite as mar-

Thomas Howard has joined the data products group of itel in the US us vice-president, finance, Previously he was assistant corporate controller of Fairchild Camera and Instrument Corp.

Jim Kane, general manager of Computer People Contracts, a VLI company, has been appointed managing director. Mike Singleton hus joined the company as sales executive in the Home Counties, from DEC where he was senio commercial accounts representative. Roger Smith, previously a sales executive with Gestetner, has joined Computer People Contracts, us a sales executive in the South-

Pat O'Donoghue of Cara Data Processing in Ireland, has been promoted from senior sales executive to head of sales, bureau sales division.

Stuart Ramsden becomes systems support manager for Redifon Com-puters' Northern branch. Previously was supervisor, field operations is the company's technical information organisation. Dean Webster, pre viously a systems analyst for central accounts with Redifon, becomes systems support manager for the fluancial branch of central accounts.



Jackson to board

CUSTOMER services manager of Computer Technology Ltd. Jim Jackson has been appointed to the board. It is the first time that a divisional manager has been made a director within CTL.

Jackson joined the support de-partment of CTL in 1971, and became successively hardware support manager, product development manager and UK service manager. In 1977 the customer services

division was formed from hardware and software support training and installation planning, and he was appointed its manager.

JULY 6 Symposium of database teachers in UK universities, polytechnics and colleges of technology, Dant of Computing Science, University of Aberdeen. Aberdeen. 8.50. Details: Dr S. M. Deen. 0224 40241, ext. 6421.

Programming group meeting. 1916 Computer Users Association. Holiday Inn. Liverpool. JULY (8-14

Curent problems and methods in par-curent problems and methods in par-tial differential equations (Fourth Sum-mer School). Liverpool, and Manchester Universities: Department of Matho-matics, University of Manchester, and 12

Mily 12

Meeting CMC Upers' Association
(CUMAC) Norfolk County Council, Norwich, 10.20, Dotals; Maidenhead 28525

JLY 18-28

Artificial intelligence; conference, AlBR/GL Hamburg, Detaits Derek Siesman, Leeds 81751, ext 7284

FULY 18-28

Local authorities Broup meeting IBM Computer Users' Association, INLOGOV, Brimingham University

JLACAL STATE Group meeting ICL Data Britan Group meeting ICL Data Britan Group, HSV-11-16, Bindan mooks, 11.00

AUGUST 8-8
Computes, communications and tecncomputes, Jerusalem conference on
information Technology, Information
information Association of Israel/IEEE.

Operational data security workshop.
Operational Data Security Corp. City
University, London ECI. Register August
18:01-283 4399, ext 347. AUGUST 21-24

AUGUST 21-28
Cybernetics and systems fourth international congress. World Organisation of General Systems and Cybernetics. American Details: Dr J. Rose, College of Technology, Blackburn, tel: 0254 64221.

Conférence on parallel processing-ISPE Computer Society/Wayne State University Beltsine, Michigan, USA AUGUST 21-23 Siggrath 78, 51th conference on com-puter graphics and interactive techni-ques. Association for Computing Machinery, Asiaora, Georgia, USA.

AUGUST 22-25

AUGUST 28-SEPTEMBER Eighth Australian Computer Con-ference, Australian Computer Society. scientific floating point maths functions. The kernel features between 4K and 8K bytes of PROM space, between 1 and 4K bytes of RAM space, five external vectored interrupts, opto-

troller cards called RCS - the

"Real-World" Control System,

They are all based to some

degree on the first version, the

RCS-K kernel module. This uses

isolated serial I/O interface with

input/output and interrupt

functions, which the com-

pany claims are not available on

The problems of developing

the exhibition by a US company,

recently introduced multi-user.

multi interoprocessor software

that can be run on any DEC System 10 or System 20, PDP-11

debuggers, as separate items.

other shiple Basics

different micros

simultaneously.

the other from Data Applicaprogrammable band rates, and tions International in Brussels. an on-board power supply to run use the new Advanced Micro from 24 volts. Devices 9511 floating point The other four versions that maths chip. This device offers 16 and 32-bit floating point maths make up the family of cards are the RCS-GCM general control with hardware add, subtract, module, the RCS-ACM automamultiply and divide, together tion control module, the RCS-PTC position and temperature with a wide range of complex controller and the RCS-ICM inmathematical functions, and the ability to interface with a strument control module.

standard 8-bit data bus Following the "real world" Mycron uses 9511 as an option theme, the company is also on its new DIM 1003, Z-80A shortly to launch a new "Real based CPU card, one of three World" Basic interpreter. Innew cards being added for use in tended for the same process and the Mycro-I microcomputer industrial control applications for which many simple Basic interpreters have been written, the DAI version is said to include

The card features 4K bytes of static RAM, 12K bytes of EPROM. two sorial asynchronous: synchronous in terfaces for handling multi **protoc**ol communications suc) as HDLC, SDLC and IBM BiSync, and two bi-directional pirallel ports in which each has eight data lines and two hand-shake lines. The optional AMD 9811 is used to provide a 24-bit. hardware floating point maths

The other two cards from Mycron are the 131M 1035 disc controller, and the DIM 1902 nmunications processor.

The disc controller can **Perate with hard disc systems** d up to 50M hytes, and in the company's own systems congurations, it is generally used with either Pertec or CDC disc drives. The card has 24 1/O lines available, and with un 8-bit proessor based on two 2901 hit slices offering a 200 nanosecond instruction cycle time, is also capable of being used for front-

end processing tasks.
The communications processor can be used either as part of a Mycro-I system or in stand-Jone mode. Based on the ZHOA. eatures IGK bytes of dynamic RAM, 2K bytes of EPROM and lwo serial asynchronous/ Whichronous interfaces for han-ding HDLC, SDLC and IBM Misyne communications proto- existing microcomputer devecok. Baud rates are from 50 to 38,000 baud. Data Applications Internatio

has introduced the AMD down and up line load to and

53.5bn 'personal' growth

vices.

APERSONAL computer market will have risen to 1.2 million with \$3.5 billion by 1982 is one prediction to emerge from the To make up this massive. To make up this massive analysis predicts To make up this massive

growth, the analysis predicts that the major markets will be found in the home programmer and the very small business sec-According to an analysis of the personal computer industry produced by a Catifornia-based produced by a Catifornia-based of personal firm. Creative stress further equipments will be needed to help specified for personal computers are said image over \$400 units in 1977. In an estimated 278,000 by year sind it products that by 1962, the re-examined to make way for an indexes and unit shipments.



Small computer systems are now gaining the interest of some of the world's largest companies, and the Consumer Products Division of ITT has taken on board the Apple II machine to sell as its own ITT Computer. Seen here in a business environment, the system had its first public demonstration at IMMM in Geneva last week.

from the development system's in-circuit emulator.

A system that created a considerable amount of interest at the show was the new Rockwell AlM-65 advanced interface nodule, which was getting its first European public showing. The module, on the stand of Rockwell's Swiss agents, Aumann and Co AG, is a lowcost system intended as a "first entry" into microcomputing.

Based on Rockwell's version of the MOS Technology 6502 microprocessor used in the Commodore Pet and Kim-1 systems, AIM 65 is a fully assembled "complete" system featuring a full qwerty keyboard, a 20column thermal printer, a 16character display and teletypewriter and audio cass-ette interfaces.

microcomputer systems using a variety of different microprocessors was demonstrated at Current prices being quoted for the system in the US are \$375 Boston Systems Office Inc, cur-rently looking for a UK agent. BSO provided information on a for the IK byte RAM version and \$450 for the 4K byte RAM version. The system has a builtin expansion capability for both peripheral add-ons and a full development system that is cap-able of operating with some 30 system bus, and both are compatible with the Kim-l System. It will be available in the UK It is in fact a software package through Rockwell's agent,

iran sets up company WHILE the National Enterprise Board's plan for a UK semicon

ductor company is in its infancy, the Iranian government has esablished Its own company Electronic Component indust-ries with an initial investment of 18,5 million

initially ECI will confine itself to encapsulation, and has apent \$1.4 million on testers from Teradyne, and \$900,000 on en ion equipment from kras Corp.

Encapsul in August

DIY show reflects growing interest in 'personal' market SCMP processor. systems continued last week at London's West Centre Hotel, where the DIY Computer Show

was held. Although originally intended as a showcase purely for the DIY enthusiast, the exhibition had been spread to cover the small business systems

The DIYer was not without some things to see, however. On the Bywood stand for example. the company was not only showing its existing Scrumpl 3 Microcomputer, but was also talking about the next developthe first prototypes of which are expected to be ready in about two months. Known as Scrumpi 4, it will be

a single board microcomputer kit with an expected retail price of under £150. It is one of the first announced applications for National Semiconductor's 32K bit ROM holding the 4K byte National Industrial Basic Language, and the board will also feature a socket for National's 64K bit ROM. Memory capacity will be 8K PROM and up to 8K bytes of RAM.

As well as being used for hobby computing and as the basis of a home computer, Bywood also expects a market in low volume OEM areas. As with other Scrumpi kits, Number 4

For those with cash in hand, stand worth a visit was that of Jade Computer Products, of Lawndale, California. On hearing about the show, the

company arranged to fly over from the US with a range of hardware and books to sell off at the stand. These included a Shugart 801A floppy disc drive for £305.50. Getting a first public showing at the DIY exhibition was the

recently introduced single card computer from Cromemco. Displayed on the stand of Comart, Cromemco's UK agent, this Z80 based system is specifically intended for the OEM process and industrial control markets.

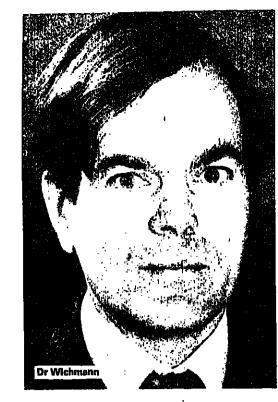
To increase its penetration into this market, Comart is planning to enter the manufac-turing field with a backplane board and chassis system for small OEM quantity applications. First samples of the S100 bus back-plane are already available, and the complete package should be ready for sale in about two months.

On the software front, the company now has available a modified version of the Cromemco 16K Basic that accommodates use of the North Star floating point maths card.

PDP 11 INTELLIGENT PACKAGES INSTA-PAY INSTA-LEDGER PDP II/AND MICRO-FILE COMPUTERS . . HOW DO WE GET THE IMPOSSIBLE . . . -ATAILOR-MADE SYSTEM -WORKING TO OUR COMPLETE WHY NOT GET AN SATISFACTION MINTELLIGENT -IN THE NEXT 14 DAYS -WITHIN BUDGET PHONE COMPUTERSENSE on 01-404 5011 or 01-251 0520 INTELLIGENT PACKAGES - WORKING SYSTEMS WITHOUT WAITING -



COMPUTER WEEKLY; June 29, 1978 A mini problem for the



The Pentagon's project to create a state-of-the-art language has attracted much attention. The last similar programme was the US Navy's development of a standard language for data processing. This resulted in Cobol and the fruit of the current work is likely to be at least as widely used.

In this article, Dr Brian Wichmann of the National Physical Laboratory reviews the progress made to date and examines some of the features of the language requirements and proposals. Dr Wichmann has been closely involved in European work on the

US Ironman project

By Dr Brian Wichmann

artment of Defence (DoD) has ubarked on an ambitious proamme to design a new langu-se for "embedded computer stems" - ie in UK terminogy, real-time systems.

A major objective of this proct is to reap the benefits of Andardisation. Whereas the K Ministry of Defence uses the control one high-level language, amely Coral 66, the US is currently using over 350 languages a about 250 different machine

The US has shown great intest in Coral 86 and the success f the UK Ministry of Defence in stublishing it as a standard. owever, it has decided to aim : a much higher level language, propriate to the needs of the 80s and beyond.

The project started about ree years ago when an initial ecification of the requireents for the language was pronis was later successively fined in a series of documents illed Woodenman, Tinman,

onman, and Ironman (revised, ily 1977). The Ironman requirements ere used to assess existing inguages to see if any were

ppropriate as a basis for deveopment. It was felt that PL71, ligol 68, and Pascal could be sed as base languages, and enders were requested for anguage proposals to meet the ronman (revised) specification. ronman (revised) specification. rent usage. Moving from Corel 66 would be a significant step ractors were chosen, all using forward whereas those already ascal as a base language. In using RTL/2 may not find the

S MANY readers of Computer February of this year the DoD yeekly will know, the US Depublished these proposals with out identifying the contractor responsible. Each language was given a colour code so that comments could be elicited on the language designs without revealing the design team res-

tinue working while Yellow (Stanford Research Institute) and Blue (Softech) will not. In the next stage the two contrac-tors selected will refine their designs to meet Steelman and ement a pilot compiler.

It is DoD's intention to make machine independent compiler freely available and hence, after writing a few code generators implementations of the final anguage should be available on a wide range of machines. However, the complexity of the language is such that compilers are unlikely to be very fast or

Hence, there may be problems in running the compiler in a typical minicomputer environment. On the other hand, the language designs do not assume the support of a large operating system and hence compiled programs could easily be run on. minicomputers as well as the

better microprocessors.
In what environments is the language likely to be most popular? Clearly, the relative benefits will depend upon cur-

definition RATIONAL-NUMBERS: ne RATIONAL =

> NUMERATOR INTEGER: DENOMINATOR, (1. INTEGER LAST):

function (X: Y: RATIONAL) return BOOLEAN: function (X, Y: RATIONAL) return RATIONAL; function (X, Y: RATIONAL) return RATIONAL; MULT

procedure SAME_DENOMINATOR(X, Y) access RATIONAL

begin [reduces X and Y to the same denominator] function EQUIV (XY-RATIONAL) return BOOLEAN; U.V. RATIONAL:

SAME __DENOMINATOR (U,V); toturn (U.NUMERATOR - V.NUMERATOR):

gure 1. A rational number package using the Green language,

function ADD

fimetion MULT

Many real-time projects are still undertaken in assembly languages, particularly systems programming, and in this area the new language could have a

cluded from its study applications which are currently handled by Fortran and Cobol. Nevertheless I would also expect many scientific programmers to prefer the new language because of its better control structures,

significant impact.

்'IT is the Pentagon's intention to make a machine-independent compiler however, the complexity of the language is such that compilers are unlikely to be very fast or small. Hence there may be problems in running the compiler in a typical

data structures, and precision

What are the main advantages the new language would give? Many of the features are iready available in Pascal and can be briefly summarised as

 Good control structures (if – then — else, for, repeat, while,

 Good procedure structure. with nested scopes for variables. Powerful data structures vithout any run-time penalty... Arrays (of static size) and ecords can be freely used without garbage collection or acomplex run-time system.

 Simple variables can have range limits imposed — permitting extensive compile time. checking. Typically an integer (i) is declared as being in the subrange 1. N and hence A [I] is valid if the same subrange is

used to declare the array.

Variables can be declared. to be of a type which has only a For instance a variable of type DAY would have one of the values MONDAY, TUESDAY, WEDNESDAY, etc.

However, many further facil-ities are demanded by the Ironman requirements resulting in a language which is much more. If the compiler can show that powerful than Pascal without the condition is false, then the reducing the capacity for program will fall to compile, but compile time checking: These if the condition cannot be

I Data storage whose size is

additional features are as fol, verified by the compiler, appro-lows. priste code can be generated to

floating-point data types.

4 General expressions to be evaluated at compile-time.

3 Control over the precision of

5 A method of handling exceptional conditions (which could be detected by hardware The DoD has explicitly ex- or software). This enables a programmer to conclude an activity cleanly in spite of unexpected

6 Encapsulated definitions to reduce the visibility of names and increase the modularity of

minicomputer environment

7 Facilities to run parallel processes with low-level synchronisation primitives.

8 A method of specifying the physical lay-out of data items. low-level input-output, and a

means of writing or incorpo-Facilities 1,5 and 7 may have a small run-time penalty, but the power provided to the programmer makes this worthwhile, All the other extras place a significant burden on the com-

piler but allow the programmer to code quite complex tasks with A major emphasis has been placed on the ability to perform used with large software sysas much compile-time checking tems. For instance, given a as possible. With many complex matrix multiplication routing weapons systems, live testing is MUL (A,B,C) with C being the elther very expensive or not possible at all. Hence, simulated fall if C=A or C=B, but how execution (with checking) of many systems check for this? duction compilers formal verification methods is Another interesting area for general use.

to be preferred. Good design which is evident in the successful languages — allows a large amount of checking with out placing an undue additional burden on the programmer. For example, the programmer can insert a statement in his

· program — assert (boolean expression) — meaning that the stated condition should be true. check the condition at run-time.

types and no implicit conversions are available between types. Hence, the typing mechanism acts as a barrier between variables so that the user can be more confident the program does as he intended. An Ironman requirement is

that the strong typing mechanism should be preserved with separately compiled routines. Hence, the parameters of subroutines will be checked in the same way as every other con-

In spite of the progress made in two provisional language designs, many problems are not yet fully resolved.

For instance, Ironnian required that "aliasing" should not be permitted. By this, one means that two entitles given a distinct name in a program must be distinct. Clearly if two pointers X and Y both point to Z then aliasing occurs between X and Y. Ironman did not require that is should be avoided, provided that Z was of a type that was always accessed via a pointer.

Even with this relaxation, aliasing is very difficult to prevent in a language of the complexity proposed. For instance, if X is global and Y is a parameter by reference of the orocedure P, then P(X) will cause X and Y to be alfased if the global X in accessible in P. The Red language avoided this by insisting that he procedure P imports X so that the call of P can be rejected.

All this may seem rather pedantic, but it is necessary if verification methods are to be result; the routine will usually which will certainly require further consideration in the language designs is the handling parallelism. The Green language is the only one to have a method of handling tasks which could be easily extended to a multi-processor system (with or without shared store).

In the Green design, each task has parameters called "boxes" which are data items whose contents are transferred on the basic primitives send and receive. The two tasks which communicate via a box are synchronized at the send and receive. There is no buffering uplied by the mechanism since both tasks necessarily have space for the data transferred.

Now that individual micro

processors can be purchased very cheaply, the ability to exploit such systems within one anguage could be very important. The Red language contains a "monitor" system which allows mutually exclusive access to shared data from parallel tasks. This is an importint requirement when several tasks run on one computer (and hence share store). This requirement can be programmed using boxes in the Green language but the code would be more cumbersome than with the Red language.

The next phase of the project will last until April, 1979. The contractors will produce a more rigorous language definition and no doubt revise the language in the light of comments received produced for each language so that coding experiments can be undertaken to validate the be made in 1979, but even then it will be some time before production compilers are available

TYPE ARITH-STATUS ENUMICK, OVERFLOW: UNDERFLOW):

/ARS, ARITH-STATUS INIT OK: VAR A.B.X FLOAT (5, -1.0E7. 1.0E7) INIT O.O.

ON X-OVERFLOW, X-UNDERFLOW, X-ZERO-DIVIDE, X-ANY IN X = (A'F(B) - B'F(A)/(F(B) - F(A): DO SELECT LAST EXCEPTION FROM CASE X-OVERFLOW, X-ZERO-DIVIDE

CASE XUNDERFLOW -> S - OVERFLOW: RAISE LAST EXCEPTION

data dependent (like Algol 60) Both Red and Green have END ON:
arrays) strong typing as in Pascal
2 Fixed point data types in that is the user can define new Figure 2 Handhay arithmetic exceptions to the Rad language.

SMALL BUSINESS SYSTEMS

Although small business systems were first aimed, naturally enough, at small companies and first time users, they are now also accepted as key elements in the development of distributed pro-

cessing networks in large organisations. The continual reduction in the cost of minis and micros has meant that small systems have been able to take over much of the traditional VRC market and, at the

other end of the scale they are moving into the province of the lower ranges of mainframe. In this first article Keith Ruddle, of Arthur Andersen and Co, looks at the confusing choice now open to

users, and on following pages David Shirley, of Computer Information Centre, outlines software requirements, and Harold Lea, of the NCC, offers some guidance to newcomers to computing.

Confusing choice in a growing market By Keith Ruddle

pendent unit of a large business, is facing an increasing number of choices at the lower end of the business computer market. Manufacturers of hardware. with minicomputers and microprocessors becoming cheaper by the minute, are now competing favourably in the areas where accounting machines and visible record computers were pre-

viously dominant Similarly, the overlap in applications between these newer machines and the traditional small mainframe products is becoming considerable. The result of these adyances appears to be more confusion for the first time user. Furthermore, a new and large market of small businesses is wing introduced to all the problems of dabbling in the in dustry: systems planning, design, implementation, operation, und support

As an overview, one should first establish what "small hadness systems" rently means, then look at some of the significant trends in the market. and finally highlight the problems to be addressed by the email comfinites, mest

In common with the rest of the computer industry, terosimology is applied loosely at the lower end of the market A "small husiness system" generally refers to a small computer, probably operating in an ordinary office environment and performing commercial business applications. The hard ware can range from visible record computers, through cassette systems, floppy disc systems, to disc based minicionputers and small mainframe

Machines.
Although this definition covers the whole range, the real changes and growth have been seen in minicomputers. Even here, the definition is blurred. is used simply to describe the phenomenon that has occurred at this end of the market. It is safe to say, however, that machines with desk-top terminals, and built in data storage on dice have become the heinstream products, rather an an expensive, new technic

The traditional commercial ations are will prominent. such as order processing.
secounting ledgers and statisics, work recording payroll and
that hes to some extent, more dopulaticated manufacturing simple operation plansing and control. However, we sold have to include the my the development of the renewed attack on the systems development of the renewed attack on the systems development. The time and very great the operation to the operation t manufacture and small business Application software, to measure in as past of a larger form the business functions to make the business functions to make the business functions an area of the control mainfrance in this asymptotic cost and difficulty.

case, the local processing remains as a small business application, with an intelligent computer at the local site. It is however, linked to a mainframe either to provide co-ordination of business information through a central group function, or to have access to more powerful processing. Technological advances in in-

tegrated circultry have had an impact in several industries. from the calculator market through to microprocessors for appliances. In the business computer market, the effect has been equally drustic, and will continue to push down the hardware cost per unit, and increase the processing capability The stage of "a computer on a chip" has not yet been reached commercially, but is rapidly approaching. These trends in hardware, by

orducing the cost for the same. or batter level of performance are making decentralised and distributed processing economically sensible, and cost effective computer processing within reach of the smaller office Simple disc based aunicomputers with limited peripherals can now be purchased for under £10,000. Indeed, for this type of system, the peripherals - printer, store,

steen and data entry terminal -- constitute the major part of the investment. Processing hardware is becoming simple with less need for manufacturers to design sophisticated control logic.

Two simple minis can be better and cheaper than one complex machine. The trend in processing cost can give each local manager a machine of his own, and he need not necessarily watry if it is not used to its full comes to the minicomputer market, competition is getting tougher, with literally dozens manufacturers producing cheap reliable and flexible hardware. With such a level of competition however, many of them will not he around in five years time.

The rapid fall in hardware costs is emphasising the high cost of software. Software deve-Supment remains very labour mensive and labour costs are itereating it is only recently that improvements in minicon puter systems software tools have been made. Traditionally, municomputers have supporte simple operating systems and low level programming languages New Incheses, we are seeing the development of dataheir management systems, real time systems development aids, and high level languages to

Application software, to per-

To provide a cost effective busi- available, prospective new cusness application, packages suitably modified for particular cussion to buy a computer with tomer needs have become an industry in their own right. This results in not only a wasted Compared with simple accounting machines, however, small disruption to a business that business systems can support complex, integrated applica- smoothly. Smaller companies tions which bring with them major problems in design and

With one or two notable exgeared to providing the complete "systems service" that we ment decision. are used to on the larger machines, including application software products and support. approach of providing the whole ware. The original manufacturers are often content with selling ut a discount to this intermediary, and the latter deals directly with the final customer for all aspects of the system. This leads to a proliferation of apparently different machines

The number of potential users of small business systems is growing, and more companies than ever are becoming exposed to the pitfalls well known to personnel experienced in the in-

Although expert advice is the unsophisticated company,

tomers still approach the decilittle forethought and planning. investment but considerable may well have been running typically have no expertise in data processing and the same mistakes are repeated across many first time users. It is posceptions, the equipment sible, however, for management to take the correct preliminary steps before making an invest-

First, in systems planning, which is really an extension of normal business planning, This has resulted in software or systems "houses" adopting an major business priorities, and the overall systems objectives. package of hardware and soft." The company must decide what overall systems improvements are being sought. Once some agreement and commitment is reached, then management should spend some time is educating itself as to how "small business systems" might schieve these improvements. The prospective new user often has little or no concept of what a

computer is, or how it can pro-vide "systems solutions." Once this point is reached, then the second phase of deve-



Keith Ruddle is a manager in the Management Consultancy Division Management Consultancy Division of Arthur Andersen and Co. He

with no external assistance, this may not result in a highly technical product. There are, however, basic guidelines that can be followed, and the vital goal is to establish some form of statement of requirements before approaching the supplier of the

Selection of prospective vendors requires some basic criteria to be established. A questionnaire and checklist can be developed against which proposals

can be evaluated. This must installation and maintenance hardware and software, together with specific questions on installation experience. Finally, before a decision to proceed is made, the benefits

and costs must be established together with a schedule of olementation steps, effort, and timescale.

A small business system is not easy to install and run, and should not be regarded as simply grandiose accounting nachine. The trend is, however, owards "turnkey" installation and simple operation. In these cases, the supplier or perhaps a contracted software house, pro-vides all the program development effort and installs the machine. Training for operators is also provided.

Even in this approach however the local management must perform particular duties to ensure a successful installation: close monitoring of package de-sign and modification to the specified requirements; full project control over timescale and cost; detailed participation on a comprehensive systems test; planning and organisation of the hangeover or conversion activfull user participation; and continued after conversion.

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How to choose your first computer

THE acquisition of a computer system should be treated by the first time upon with the computer of selling to illust-system contains many similar-system contains many similar-system contains many similar-system contains little or no clerical dissipation. first time user with the same amount of care as used in the selection of a wife. A mistake at any stage in the process can lead to a great deal of acrimony and

It remains a constant source of amazement to many members of the computer profession that extremely intelligent people, at a high level of management, treat buying computer hardware with less thought than the purchase of a washing machine.

For example, some senior executives of firms who are themselves in the business of selling, assume that in some way the marketing of computer equipment carries with it a pinnacle of honesty and integrity. This is not intended, I selling of computer systems is in start has been made.

rate, much less emphasise, the possible drawbacks. One firm, which is involved in

the construction of houses, ouite happily believed that, when the system had gone live, the software supplier would drop everything and instantly correct any software problems. It can only be assumed that repairs to their own houses were carried out in such a state of willing-

From such stories that circulate concerning disastrous failure of computer systems, the reader may be left with the impression that the world of computerisation is beset by pitfails left to trap the unwary. This may not be absolutely true but, with that thought at the hasten to add, to imply that the back of your mind, a reasonable

ities to the acquisition of any piece of reasonably expensive machinery. The major dilference lies not in the machinery itself but in the fact that a computer system will require programming. The computer programs will have to be written by people. More importantly, these programs will probably, even if it is only indirectly, be specified by you, the first time user with ttle or no computer expertise. If the requirements can't be de-

a great deal for a computer specialist to provide good satisfactory solutions. So, how do you go about acquiring the perfect computer solution to your current business problems? First you must be clear about the reasons for

fined by yourself, it is expecting

cipline and problems are inherent, due to the type of staff or other valid reasons, these problems must be solved before computerisation is attempted. Computers will not solve the problems of organisations which cannot maintain a good manual system. In fact, the installation of a computer will only aggravate these problems. Assuming that you have a

reasonably efficient existing method of working, why should you computerise? Even if you know the limitations of the current system and can define the requirements of your computer system, what will it cost and is it

It is difficult for a first time user to have the necessary expertise to answer these quesinstalling a computer. If the tions and, therefore, it is recom-

mended that good, professional and independent advice is sought. This may appear initially to be expensive but then, mistakes at this stage can be extremely costly in the long term. After all, one is unlikely to satisfactorily cure toothache vithout resort to a competent

Thus, a feasibility study should be carried out. This will consider the likely requirements, benefits and costs of a computer system. The justification will then be a comparison of the costs against the benefits. Since the benefits may be tangible, reasonable to cost justify, safety in the sense that any or intangible, difficult to cost machinery recommended will be justify; it is up to the user to at least as powerful as is make the final decision as to required.

If the outcome of the feasibility study has indicated that you should progress further, the next stage will involve a more detailed definition

This will involve the identification of each application area such as sales ledger. purchase ledger, the volumes and type of input and output with timescales, the definition of computer record contents, etc. It is also important at this stage that a reasonable estimate of any future enhancements is made. All this information should be put in the form of a particularly to your area. Suptender document against which

suppliers may submit proposals. The preparation of this document gives a two-fold advantage. Firstly, the definition of computer system requirements enforces a high degree of brain searching and discipline within the user's organisation. Secondly, because every proposer has been given the same information, a comparison of like against like can be made. As in the feasibility stage, professional advice is extremely useful, and probably very

necessary, at this stage.
It is appreciated that the actual definition of requirements may be difficult, given a lack of knowledge as to the capabilities of computers but, even without advice, a serious attempt must be made. It is useless to define requirements with such phrases as "make the organisation more efficient." The "hows" and "whys" behind such statements must be clearly understood, together with the necessary justification for each section of the requirements. even if this is not put in the specification. Computers, at all levels, have the in-built facility to reduce forests to woodchips and make millionaires out of

paper suppliers!
After receipt of proposals, the selection process will begin. At this stage, if not before, the user will realise that the amount of jargon used and unnecessary iterature that most suppliers produce, makes selection as easy as driving across Piccadilly Circus blindfolded.

Re-entrant code, virtual storage, swap ratio, unibus, megabus, etc - not only are the words confusing but it is difficult for anyone to compare the performance of two or more

Harold

How does the first time user go about the jungle of computer selection? Harold Lea (left) of the National Computing Centre, says it is an acquisition that should be treated with the same care as used in the selection of a wife - a mistake at any stage in the process could load to a great deal of acrimony and disenchant-

machines that operate under different criteria under what are. necessarily, projected circumstances. Even something as simple as file storage capacity -1,000 records each 20 bytes long makes 20,000 bytes of storage. Or does it? Any computer professional will say that this is not true, but it is this type of arithmetic that appears all too often

So how does the first time user go about the jungle of selection? Seek expert advice. Even if the experts cannot be absolutely certain, they should at least be able to offer a high degree of

One reasonable method of selection involves the identification of factors which are important to the user. These factors are then graded in importance and each proposal marked. A multiplication of the scores and grades then gives a mathematical indication of the most satisfactory solution. There is obviously more to the final selection than the mathematical score but at least the reasons behind the score can then be identified and discussed.

Proposers should be asked to submit lists of existing clients. port can be very much area de-- iændent.

The type of applications software that can be used falls into two broad categories. These are software packages, existing computer programs that will, for example, process a sales ledger. and a tailor-made system, consisting of new programs designed and written specifically for a particular client. Cost is generally a major factor in deciding which approach is to be made, although it is often a combination of existing packages and tailor-made packages which provides the most sati factory solution and, therefore, cost may be secondary. Existing software packages are generally cheaper and have secondary benefits of being, in theory at

any rate, tried and tested. Common omissions when es-timating costs include monthly partitioning, operating system software, training, power sup ply, air conditioning and file conversion. Your £20,000 purchase is suddenly costing £50.000 to run over five years.

Successful installation of any computer system is ultimately dependent upon the complete involvement of all concerned. both user and supplier. The implementation has to be controlled in the same manner a any project, be it the erecting of a building or the installation of manufacturing machinery. Fall-ure to control a computer system installation will create problems in excess of those inherent

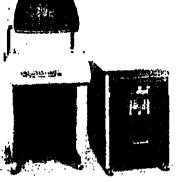
in any significant change in the manner of working.
Finally, when all about you appears to be falling into one that gigantic heap, remember that computers are installed successfully and do produce extensive benefits.

Prices cut too low for health of the industry By David Shirley

DURING the past five years, you need; file creation and Executive 15 is a typical will be available on it. Since the hardware advances in the design of small business systems have maintenance, file enquiry, stock receipts posting, stock issues been more dramatic and more publicised than in any other area of computing technology. The price of complete small disc systems in particular has fallen to the point where several suppliers offer a complete system — VDU, two diskette drives, processor, and printer — for less than £10,000. Ten years ago a rate for programmer time system of comparable power would have cost £50,000; even five years ago it would have cost £30,000, so the improvement in price-performance ratio has been around 300%.

Unfortunately, although the price of the equipment has changed, its design principles and the systems and programming effort required to install it have not. The budget for softwaring an interactive disc system five years ago was in the region of £7,000 for one main pplication, ie about 20% of the hardware price. The same amount of software effort is still required today, and linking that budget to the rise in cost of living, one would expect soft-

price, and the potential buyer of a small business system will not consider such a software cost. The computer industry is, therefore, faced with a dilemma



ware to cost at least £10,000 per

main application. But this would

represent 100% of the hardware

A CIC Executive 15 processor with two disc drives, in its new pedestal cabinet, with the 382 video printing terminal which incorporates a YDU and 5lichps metal dalay wheel printer. Price of the configuration is £10,500, and its first installation

prices failing to absurd levels, supplier has to produce four disers are still expecting software—sales ledger packages rather to cost 20% of hardware, than one, but in practice there although all the factors influen- are other variations in posting the real cost of program have been rising rather than falling. Unless a radical change can be produced in users' attitude to software, the gap between what they expect and what they are prepared to pay for it will con-tinue to widen, while professio-nal standards will go by the sheets, punches them into a board in a frantic effort to install

sophisticated equipment in the minimum possible time.
The small business user is the focal point of this problem because he cannot justify the cost of the equipment unless he uses it for several functions. A typical recently with LINK for the tange of applications for one user would be payroll, stock towns to takes a very long. control, involcing, sales ledger, time and a vast budget to create bought ledger, and nominal, a package generator, and hard-like representations.

posting, stock allocation, purchase order posting, file list, complete or selective and list of items which have fallen below reorder level.

It is totally impossible to specify, write, and test any one of these programs in less than a week. The minimum charging needed to give a software organisation any hope of making a profit is £300 per man week. Thus the stock control application alone should cost £2,400 plus at least £300 to install it at the customer site and to train the operator. Multiply this figure by an average of four applications installed on each small business system, and the computer industry should be charging around £11,000 for

software per installation. In fact, it is charging less than half this figure. The difference is often made up by severe loss of profits by the supplier, and sometimes by impossible schedules, short cutting on program testing and lack of operator

How can we legitimately close the gap between what a user should pay and what he is prepared to pay? One possible panucea is the program puckage, written once but installed ut many users. In theory, this approach should be viable at 90% of potential users, but reality is sadly different. Take an

One user will insist that discount be posted separately from cash and that it should be shown in a separate column on the statement. The next user will object strongly to any reference to discount on his sales ledger. The result is not one package but completely different sets of programs for ledger posting and talement printing.

An even more fundamental difference between customer mands is that while most sales edgors work on the "brought forward" principle with cash applied against the total balance outstanding and the balance for a particular period, a large will be at Fox Associates in rundington, London, where it will be used for word processing se well se upon open item accounting which requires cash to be offset which requires cash to be offset.

which is rapidly attaining crisis Even this variation plus disproportions. With hardware dount variation means that a lechniques and output format which bring the total number of possible sales ledgers to about

> It standard packages are limited, what of the possibilities sheets, punches them into a large mainframe computer, and out comes a specially compiled and tailored "package"? This approach can certainly work NCR did it many years ago with BEST for the 315, and Burroughs repeated this success more

This represents a lotal of about ware developments are now pothe programs. If anyone doubts curring so quickly that by the time a package generator was time at package generator was complete it would no longer fit the equipment.

The development of CIC's

example. When it was launched in January 1977, it offered a "glass teletype" VDU with upper case only, a standard memory size of 24K, 2 or 4 diskette drives, and a 30 chps matrix printer. In April, 1977, the standard memory size had been increased to 40K and the print speed to 100 lines per minute. In October 1977, the VDU was changed to a model with upper and lower case and direct cursor addressing. In April 1978, a new terminal was added combining a daisy-wheel printer and an even more sophisticated VDU in one 7680 characters. In July 1978, a which will work reliably for 10 million byte cartridge disc years in the environment of a

production of a package generator requires an elspased time of at least one year, how can it possibly be produced against such a rapidly changing hardware background? The truth is that the computer industry is cutting its prices too low for its own health or that of its customers. This lemming-like rush to the brink of commercial

suicide is being accelerated by the arrival of the hobby computer which is fostering the illusion that a complete working computer system should cost less than a secondhand car. In fact, the price of hardware

small user who is changing functions, programs, and stationery three or four times a day has probably reached its lowest viable level, particularly when one bears in mind the high cost of selling to the small business user. Anyone who believes that a

programmer is someone who translates simple business arithmetic into computer codes should read the inland Revenue's latest publication Specification for PAYE Tax Routines - April 1978 Edition. Today's systems programmer,

therefore, requires almost as much financial knowledge as a chartered accountant and has to know his equipment, its factor.

some of the 200 exhibitors:-

of its customer: David Shirley, o puter Information
And he warns the lemming-like rush brink of comm suicide" is accelerated by the of the hobby cor 'which is fosteri illusion that a co working compute tem should cost le secondhand car.

The computer ind

cutting its prices for its own health

gramming language Such knowledge is not easily, yet it must be thoroughly and carefully if the installa puter industry cannot skills sort and at the maintain a reputation fessionalism, and at p reputation is certainly The cost of a small bu stallation may shortly irreducible minimum di the cost of software an rather than by any 1

"Computer Weekly", "Data Processing" and "Systems International" present

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Olympia, London, December 5, 6 and 7 10 am to 6 pm (closing at 4.30 pm on the last day)

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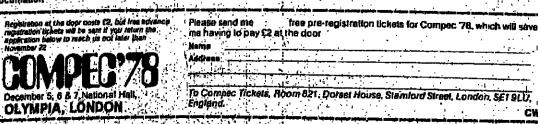
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epresentational.

uraging better contacts and became apparent that many hisoperation between schools d industry. At this school, rough the generosity of veral local firms, we have quired a PDP-8 and ancillary uipment. We have no finanal resources for computer illing to donate, either to aintain the school's computer tivities or for a small museum:

reparing.

Given that many colleges of In the course of obtaining education are being closed

Clearing doubts on post codes rmed by Ron Lindsay's marks in your article "Doubts er Post Office coding" (CW.

stem has still some way to go fore it is workable, is just not ge numbers of firms and orneeded to cope with growth. From the start, it was specifically planned to cater for expansion and to last at least erested, a free booklet entitled

present, is insufficient to be at all

ising society and historical

material relevant to this is fast

disappearing or in some cases

The computer is revolution-

prehensive reference system in the UK with unique facilities for keeping it up to date and with an Post Office

WHO ARE BUYING

down, leaving excellent buildings available, one of these torically significant pieces of could surely be a potential site. hardware were being discarded. It seems obvious that there is a educational purposes and future serious need for a national museum of information sciences research would be considerable. Even if the idea of a national and computing. A single gallery

museum is not original, I would be interested in the response of Computer Weekly readers to the

M. J. COOKSON Head of Computer Studie Nicholas Breakspear

RC School Colney Heath Lane

ay 25). His claim that postdes as a business reference

It is not possible for me to extol the benefits of postcodes Using Postcodes in Business As numerous businesses have Systems" is available from Postfound to their advantage, the postcode file is the most com-PETER H. YOUNG

LOOKING FOR PEOPLE

COMPUTER SYSTEMS?

LETTERS

To: The Editor, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU

Chance to influence Cobol development

pecification (CW, June 8), but he is off-target in some of his

I have heard a number of explanations of the requirement to support 18-digit arithmetic in Cobol, but the size of a particuiar machine's arithmetic registers is not one of them. My favourite explanation is that 18 digits were necessary to represent the number of cents in the US Gross National Product,

> mon Operating System Control Language, can write to Codasyl at PO Box 1808, Washington DC, PHILIP R. BROWN

in the current Codasyl Cobol

Journal of Development and I

know of no reason why it should

not be adopted for the next ver-

sion of the ANSI Cobol standard

which, at present, is being deve-

ANSI was due to begin con-

sideration of Procedure Division

elements only in March this

year, and it is unlikely to have

completed this task in the two

In the longer term, anyone wanting to influence the deve-

coment of Cobol or the Com-

meetings since then.

Britain— 2000 AD CONGRATULATIONS to David

Butler on his winning essay (CW, June 15). Lateral thinking leads on to placing all the Green Circle Plan people in under-ground houses — before 2000 An.

A group I was once associated with, calculated the the whole UK population could go into individual "detached" underground houses on a

uarter-mile grid. Leaving Britain with no plan ning blight and even more green and pleasant land for year 2000 with Infosoo.

MAHDNI BOB

Being fair to the PO and future strategy.

The

of

value

standards

YOUR report of the internatio-

nal conference in Paris on

standards for computer users (CW, June 15) mixed up two

separate points I was making. First, there are currently about 350 authoritative

standards relevant to the use of

computers. About 25% of these

are upgraded or amended each

year, and there are about 80 new projects in hand. The only source of information about

these is a feature in the Com-

Secondly, I contrasted the

achievement in establishing

standards by the CCITT, which

now has about 65 data trans-

mission standards, some of great

sophistication, with the ISO

erformance in data transmis-

The CCITT workers know the

sion. The ISO group has pro-

duced over 1,600 documents but

value of standards, but com-

puter people are not so

motivated. However, at a recent

ISO meeting, the UK challenged

the others with these facts, with

British Standards Institution

I WAS puzzled by Puzzler's answer (CW, May 15). You really didn't have to go to all that trouble — any self respec-

ting soccer maniac knows that if

you lose one mutch and have

only one goal scored against you

in three matches, you must have

Please make future puzzles

STEPHEN WATT

even easier, since I don't have

the time to work them out!

Too easy

for some

been beaten one-nil.

remarkable results. So we may now expect an improvement.

HUGH McGREGOR ROSS

Data Processing Standards

Committee

puter User's Year Book.

only 11 standards.

I WAS interested to read Focus on the treatment of the Post Office at a recent DPMA conference (CW, June 15).

The problem of the representation of monopoly organisaferences is an exercise in treading the narrow line between providing a sales platform and promoting a kangaroo court. This problem is exacerb ated in the case of the Post Office, since every DP manager has his own horror story about telecomunications services in this country.

Just because the Post Office is ioiv, nowever, and bi cause its services are essential to or the user. business ilfe, it is extremely important to have a balanced view of their present facilities Chorleywood

balance by involving the PO in presentation will be subjected to critical examination from major users and consultants and during informal sessions, from any participants with something to say.
While this may not be the

In our conference next Sep-

tember, "Post Office Telecom-

munications - the way ahead?

we have tried to achieve this

perfect forum, at least the prisoner is allowed to speak on his own behalf before sentence is passed - whether you consider NEIL A. JAMES

Information Studies Ltd

Politicians wake up

The chairman of the working party, Eric Hammond, said it was necessary to reverse the current dependence in the UK on imported integrated circuits, and added. The rich nations of the future will be those with their own microelectronics in-

The report pointed out that there could be major financial returns for the UK from microbased equipment sold on world markets but it was essential that the industry should have direct access to the latest technologies

for making integrated circuits. This applied in particular to

VISI technologies.

A major stumbling block facing the UK microelectronics industry in achieving these objectives, said the report, was the recruiting and retaining of qualified staff. The present pay and salary restrictions and the erosion of differentials was par-ticularly unhelpful. As all user industries depended heavily on the success of the micro industry, if must be considered a priority subject, the report

t would be ideal if we could devise a method of verbal communication between machine and man, and apply this same system to inter-machine communication. This problem is the target of a one-year project which is being carried out jointly between Frank George, Professor of Cybernetics at Brunel University, and Tom Addis, a research worker at ICL's Research and Advanced Development Centre at Stevenage. It is hoped that both ICL and the Department of Industry may become involved in the

project at a later stage In this article, Professor Frank George looks at what the problems are and the way things may go.

Author of many books on computer-related topics, he was editor of Science Fact', a book which presented the latest achievements in the diverse fields of technology and science. One of his latest books is Machine Takeover, which looked at the dangers represented by the emergence of machine intelligence (Futureview, January 12).

tive languages for man-machine interaction has been going on for a long time and has taken many different forms 1 am mainly concerned in this article. with the latest attempt, which is now going on, to find an automatic speech recognition, system. But behind this effort (column) of a matrix, say, where the number is found and the lies a whose world of diversity.

answer "we have 463 sub-Rems It has been realised for several actory human-like system (artificial intelligence) required that it has access to a natural

This implies, for simulation purposes, the need not merely to use, but to learn to use, such a language. For synthetic purposes — this is where the spin-off and the focus of this article is - the problem is unough to be able to converse in a natural

With this in mind, we mmediately find a crop of such written languages that have grown up in the last 20 years. and one can think of some like lamer, Baseball, Sir, Oracle, Lip plus a whole lot more besides These "conceptual" languages provide the necessary backcloth o the search for an auditory form of recognition.

The languages themselves fail into four categories, those with and those without syntactic anand those with and those without an inference making

Most of the languages use list processing computer languages, but this is really incidental to They have the ability to intake

a question, for example, and, after interpreting the question, supplying the answer by searching the associated database or by making inferences from the information in the

K have you many sub-items phonems can be analyzed I would like to see the main matics and involves, within that context, both syntax and enlights of such a statement tires which recur in all the sells us I lt is a question; 2 words of a sentence, and they problem with respect to need for the computer and the flow many is the interrogative recur in different patterns.

Sub-item X is the consonants are further phonemes and their sentence buman being to share a world of phonemes. 3 Sub-item X is the grouped into voiced and distribution.

The problem is one of pragential analysis and involves, within that context, both syntax and context, both syntax and semantics. Even more vital is the problem with respect to need for the computer and the problem with respect to need for the computer and the phonemes and their sentence buman being to share a world of a sentence and distribution.

The problem is one of pragential analysis and involves, within that context, both syntax and context, both syntax and their sentence buman being to share a world of a sentence and their sentence buman being to share a world of a sentence and their sentence buman being to share a world of a sentence and their sentence buman being to share a world of a sentence and their sentence buman being to share a world of a sentence and their sentence buman being to share a world of a sentence and their sentence and their sentence buman being to share a world of a sentence and their sentence and their sentence and their sentence buman being to share a world of a sentence and their sen An example would be a ques-tion like, "How many sub-items It have you in store Y?" The entitysis of such a statement

the routine for "how many," which immediately searches for "how many what?" The noun follows "how many," and if there is a further part to the blem in itself. The further step is the recogthen this intochately is encoded nition of words connected into sentences. This can be thought

 X in store Y" is printed out. There is the very minimum amount of analysis involved, but it can in some circumstances be much more complicated. It sometimes needs to be more complicated to avoid the vagaries of actual linguistic

Even when we define terms and can answer questions like "what do you mean by Z?" the terms are defined by the context n which they are used.

Now if we change the modality of the recognition of the spoken word - granted a similar subsequent analysis we have the new difficulty which we do not meet, of course, where the words and phrases are typed into the computer.
The recognition is now of

phonemes and other units of speech that can be distinguished and which we distinguish in human conversation. We can already do this for a single word connected speech - the recog-6 Most of the languages use list processing computer languages, but this is really incidental to their capabilities.

nition of a complete sentence.
The difficulties encountered

in machine translation problems over the written word occur have again, since it is both a problem of pattern recognition and a problem of understanding. The pattern recognition part of the problem depends upon the ability to recognise at least 40 phonemes in English of which 10 are vowels and 30 consonants. This is indeed a lower limit to what is required, since each phonemes can be analyzed further into 10 distinctive feasure and species.

The difficulties encountered in machine reason problems of the problems of the problem soluting, and made especially so by the need to link especially so by the need to link. As for the current research problem depends upon the such automatic speech recognition for continuity occur with the use of analyzed phonemes can be analyzed in would like to see the main in the problem is one of pragitations which is juist gathering momentum, the sim is to develop a method of automatic speech recognition for continuity occur with the use of a method of automatic speech recognition for continuity occur with the use of a method of automatic speech recognition for continuity occur with the use of the problem is one of pragitations which is juist gathering momentum, the sim is to develop a method of automatic speech recognition for continuity occur with the use of the problem is of a problem and problem depends upon the specially so by the need to link.

As for the current research project which is juist gathering momentum, the sim is to develop a method of automatic speech recognition for continuity occur with the use of the problem specially so by the need to link.

As for the current research espect which is juist gathering momentum, the sim is to develop a method of automatic speech recognition for continuity occur with the use of the problem is to develop a method of automatic speech recognition for continuity occur with the use of the problem is to develop a method of automatic speech recognition for continuity occur with the use of the problem is to develop a method of automatic sp This is indeed a lower limit to what is required, since each phonems can be analysed further into 10 distinctive fea-

(points of articulation) and bilabial, dental, etc (manner of theoretic analysis of the statearticulation). So the recognition of a single word is a major pro-

the sonse that we know that each word in a sentence acts as a But the recognition of this fact itself depends upon a measure of

of as a Markovian problem in

semantic clarity; so one might expect to invoke a field which has hardly been developed as yet — the semantic theory of infor-

that if we can recognise a word we must be able to recognise a

The fact certainly remains difficulty remains that so many sentence; it is largely the intelligence, so we must not

matic, involving gestures and showing behavioural signs of intention and the like, while the 4. A heuristic approach to the most likely match between apparent phoneme patterns and computer has to enlarge his the likely semantic context.

The relation of heuristic methods to induction and of both to semantic information theory suggests that such a trail is, to say the least, "warm" and one we hope to pursue.

conversation. family of problems, concen-The emphasis has now, for trating on automatic speech recognition (Addis, 1972)³ and a good deal of effort has already one aspect of these new devegone into developing further and this entails concept formahis promising start, but it is notorious that problems of

At least then there can be l. Science Fact, edited by Profes for Frank George. 540pp. £1.50 world, like the Winograd world of coloured bricks for building, or perhaps something more complicated, which would allow

Topaz Books.

1. Machine Takeover, by Professo Frank George. Peperback 193pp 63.50. Hardback 107pp. 67.25. Perga

active Environment using a Single Spoken Word Recogniser, by T. R



IN Amsterdam, Efficiency Beurs this year will be the tenth International Exhibition of Office Equipment, held at the RAI Exhibition Centre on October 10-18. De-

ARTIFICIAL Intelligence is the thems of a conference co-sponsored by the AISB and GI, to be held in Hamburg on July 18-24. Details can be obtained from Derak Steeman, Dept of Computer Studies, The University, Leads 2, Isl: Leads 31761, ext. 7284/7108.

A SEMBYAR programme on the "State of the Art" is offered by Control Data Institute during July and August, Most of the seminars will take piace in London, but, that on the practical applications of microprocessors and incrocomputers, and the structured design and programming workshop; will be held in Copenhagen and Amsterdam respectively; on August 3-4 and August 28 September 1. Details from Terese Barnard, CDI, 77 Wells Street, London WIP 3RE, tel: 01-637 2171.

THE seventh conference on mechanised information storage and retrieval systems to be held at the Cranfield Institute of Technology, by Inspec, the information division of the Institution of Electrical Engineers, will take place on July 17-20. It is obtilied Towards Intelligent Information Systems. Further details from Cyril

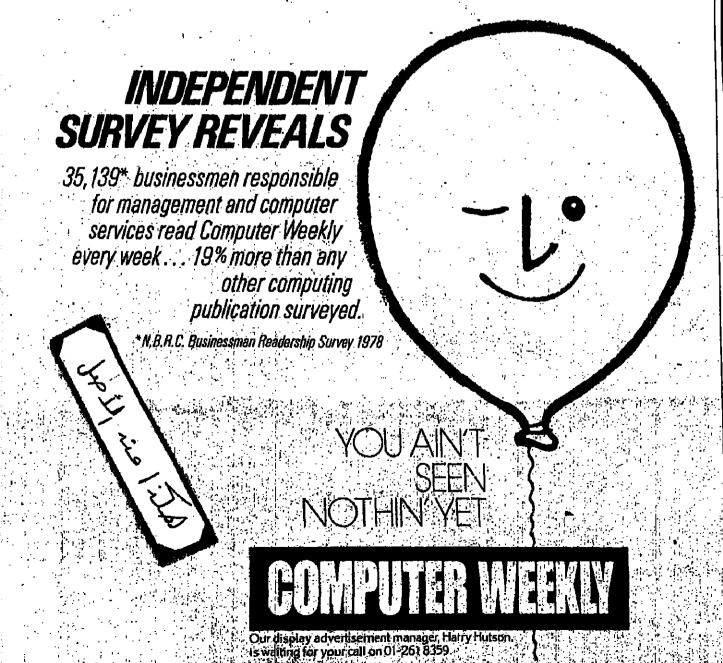
Professor George . . the pattern recognition part of the problem depends tion and hypothesis formation upon the ability to recognise at least 40 phonemes in English of which 10 and, above all, the use of heuris ire vowels and 30 consonents. sation" from the fully prag-

present project lays the emphasis on meaning and the ability to understand what each oeing involved in problem solving. Both aspects of the problem require an enormou amount of research effort.

sing, will be held at the Paints des Congrè in Paria, on September 18-22. The con ference is part of Sicob, the data proces sing, hardware, communication an office equipment exhibition. Details from French Trade Exhibitions, Frence Chemistre (Constitutions) Chamber of Commerce House, 54 Condu Street, London W1, tel: 01-439 3984

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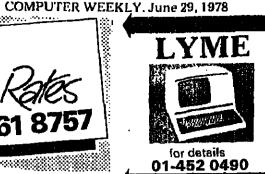
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THE Institute of Data Processing and the Data Processing Management Association have now merged to become the institute of Data Processing Management Ltd. Here the first chairman of the new Institute, NEVILLE TAYLOR, says that there is a membership of nearly 4,000, and he anticipates a growth rate of at least 30 per cent within the first year. He sets out the aims of the Institute and tells how DP personnel

Professional Institute to serve all levels of computer people

the Data Processing Manage-ment Association has now happened. The new body that has emerged is the Institute of Data

Processing Management Ltd.
Both DPMA and IDP have established a special position in the computer industry, DPMA being unchallenged as the practical association representing supervisor and management levels, while IDP created an unwith a strong student membership which could be the DP

management of the future.
With increasing awareness of the changing face of the DP industry, produced by distributed processing, mini- and microcomputers, there is a real need to recognise the broader base for recruitment to the IDPM, including user management. accountants, engineers and per-haps the new breed of DP enthusiasts, for whom personal computing becomes more than a

mere hobby.
IDPM has a membership of nearly 4,000 and from the present flow of inquiries it is not unreasonable to expect a growth rate of at least 30% within the

Entrance to IDPM can be gained either by examination or by acceptance of persons with the appropriate experience in DP. There are two professional grades, those of Member and Associate, and two intermediate professional grades of Licentlate, for those who have passed parts I and II of the existing IDP examination syllabus and with

European Space Agency. The contract, worth £50,000, and ex-

pected to last one year, provides for the definition of standards.

for on-board software on un-

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software is vital in such applica-tions, where the scope for fault-rectification is limited. This is particularly true for deep space missions, which may be beyond the range of ground control.

manned space missions.

volved talks and negotiations, practical experience, and

In addition, there will be an

Affiliate Membership, both individual and corporate. A grade of Fellow may well be established by invitation of the Executive Council for out-

standing service to the data The nims of IDPM are: To establish a professional body to safeguard and enhance the interests of its members

loyed in data processing; rivalled examination structure . To secure and maintain educational standards for the profession by examination;

 To secure and maintain professional standards in data processing by promoting the effectiveness and status of those engaged at all levels in data processing; encouraging and assis-ting members to develop their careers within and beyond data processing; encouraging practi-tioner and management training and assisting in the provision of professional data processing education and training facilities;

• To provide a forum in which the interests of data processing may be discussed and to disseminate knowledge thereon: To foster and maintain a

high standard of professionalism for the data processing manager and practitioner: To promote effective com-

munications and links between data processing and other management functions:

to government and the media:

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standards for ESA

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One task will therefore be the evaluation of existing tools in this area, such as Software

Sciences' SDS system developed for RRE (CW, March 29, 1973).

SDL, which already has ex-

htensive in house experience of high reliability systems through its defence work, will also be

topping up its team from out-side. Specific expertise in

• To represent the data processing industry nationally and to communicate members' views

In combining the strengths and resources of two of the foremost bodies within the computer industry, the IDPM has provided a professional In-stitute of Data Processing Management to serve all levels of those involved in using computers as an aid to their busi-

• To publish a journal at least

Staff have now been recruited to handle the administration and secretarial functions of the Institute under the control of a Secretary-General, and will operate from the new headquarters in Henrietta Street, Covent Garden. It is, however, necessary to retain the existing DPMA premises at 27a York Road, Maidenhead, until such time as the handover of records, etc, is complete, and all inquiries should be routed via this address for the time being.

We trust that IDPM will continue to co-operate with Computer Weekly in the way practised by the DPMA in mounting oint workshops, seminars, etc. I'wo recent events which proved highly successful were the Communication Audit workshop presented by Nigel Laure. which proved so pupular that a similar project will be mounted recently the flourishing Central London branch held an enlighoperational staff were given the opportunity to voice their opinions of their management. This proved to be extremely lively and provocative, and deservedly played to a packed house.

Conference on Very STANDARDS designed to en-company considers it essential sure software quality are to be: that standards are based where Large Data

pases

THE next international Conference on Mery Large Data Bases will take place in West Berlin from September 13 to 15. This is the found in a series of annuit conferences which hav attackly increased in important and it will be the second time

has been held in Europe. The conference is intended to identify areas of general inter-est for research, development and application of database

Berlin faire buthdrily

Some pertial travel grants are available to atudents of computer subjects and applications about be directed to Dr H. Weber, Helts. Mether institut, Postfach 29 03 28, 1000 Serift, 29. The computate is stoomying to refuse course by syrangists charter flights. A5 part of a five-year blan to good cod system: will be used to develop pulling computer serior develop major financial and vices for alking departments, the land-use database systems and london Borough of Newham, the propert applications in the propert and ICL 2000. The annual library catalogung.

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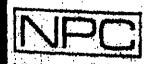
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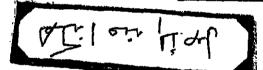
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Maia or Femalel GRADE 1 (£1290-£2345) pius £312 p.s. salary supplement at see 18 and limited 5% supplement (Phase 2).

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2120 to \$400 p.w.

13th July, 1978 FREEPOST LONDON WE 388 Principal Technical Programmer up to £7,000 p.a.

We are a thriving new company now becoming a recognised force in the computer industry (and with the backing of CDC, NCR and ICL). Our labs are purpose-equipped for state-of-the-art development of computer peripherals. Our current development includes an advanced magnetic tape system.

This senior member of our technical software group will: - take a key role in developing software for testing our high speed

computer peripherals;

 be expected to make a major contribution to the technical planning and design of future software suites.

An extensive knowledge of programming mini-computers at assembler level for technical applications is required, together with an understanding of the hardware aspects of interfacing. (Data General Nova 3 computer experience is desirable). Experience in the design concepts and programming of microprocessor-based systems would be an advantage.

Telephone Morris Chudleigh on Stevenage (0438) 66561, or write to (or phone for an application form): Mrs. Rhiannon Chapman, Personnel Manager, CPI Data Peripherals Limited, Bessemer Drive, Stevenage, Herts



CPI Data Peripherals Limited

REALTIME SOFTWARE

A vacancy has arisen for a Research Officer in the Control and Instrumentation Division of the Scientific Services Department based al Beckwith Knowle, Harrogate

The successful candidate will join a group which is actively engaged in developing real tuno system software for hierarchica distributed micro and mini computer nysioms, jo bo used for on line data scquisition, display, monitoring and control

Applicants, male or female, should proterably be in their twenties and have a good degree in computing sgrance or ; ; oquivalent qualifications. Experience with CORAL 66 is essential and familiarity with PDP 11 and/or TMS 9900 system adtware is destrable, whilst tion the carpenge in introduction

MID GLAMORGAN COUNTY

COUNCIL

County Tressurer's Department

SENIOR SYSTEMS

ANALYST (Systems Programming Team) SENIOR SYSTEMS

(Technical Project Team)

Salaries £4,759.56.£6.512.56, inclusive of nationally

negotiated supplements and subject to further review in July, 1978.

expensions.

The Authority currently operates an ICL 19045 computer and is now actively planning for the introduction of a large ICL 2900 computer next year.

The post within the Systems Programming Team will.

The post within the Systems Programming Team will involve all espects of the implementation and maintenance of the VME/B operating system and utilities, together with the provision of technical systems and utilities, together with The provision of technical Team involves responsibility for the development of systems and the implementation of technical software mainly for Planning. Architect's and Surveyor's Departments within the County Council, The team is also responsible for a large examination processing system developed on behalf of the Welsh Joint Education Committee.

A minimum of two years systems experience, preferably of a system programming or technical nature, as appropriate, and a relevant degree or recognised qualification are estential for both parting.

A flexibility working from scheme is currently operating.

The County Council's scheme for the payment of locking and describence allowances and removel expenses will

Application forms (to be returned by 14/7/78) are obtain-able from the County Treasurer. Mid Glamorgan County County, County Hall, Cardiff.

onel Conditions of Service

Caryanaing will disquestly.

proviestor systems work would be

Please quote reference SVN/472/CW

given to fresh graduates who can demonstrate initiative and enthusiasm logether with a desire to apply advanced nutational techniques to the solution of delined system problems.

The salary will be within the following range C3514 p.a. - £7101 p.a. point of entry will be dependent upon age, qualifications and Applications in writing giving full details of

age, qualifications, experience, present position and salary should be forwarded to the Regional Personnel Manager, Central Electricity Generating Board, Beckwith Knowle, Ollay Road,

Herrogato, to arrive politater than Monday 17 July 1978.

months' experience on

NCR CENTURY OR CRITERION

企COURTS

COMPUTER OPERATOR

REQUIRED

South London-up to £3,800

A vacancy exists for an operator with at least 6

equipment. The successful applicant will be able to develop their experience working a 2-shift system on an NCR Criterion N-8570

operating under B3. Here is an opportunity to

join a small team in a fast-developing installa-tion with the prospect of transferring to pro-gramming at a later date. Further details from the Computer Services Manager:

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We require assembly tanguage programmers to work PDP-11 systems software. In house development machine:

PBP-11 experience NOT required.

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Central Electricity Generating Board - North Eastern Region

UNIVERSITY COMPUTING SERVICE

COMPUTING MANAGER

Approximate are impled from graduates with orperience of computer operations for the gost of Computer Manager within the University's central Computing Service, The manager will be responsible to the Director of Computer Services. responsible to the Director of Com-puting Services for the day-to-day operation of an ICL 2976 computer together with a number of local and remote settling computers and a net-work of terminals of various types He or she will also be in charge of the training of operations self, and the provision of data preparation services, and will be suitated by a Child Operation. Deta properation supervisor, and some 25 other statif

Appointment will be made at a salary within the range E5054-E7305 per annum on Grade III, of the salary scales for Other Releted Staff, with initial piscafeant dependent on spequalisations and experience

Further particulars may be obtained from the Secretary of the University Court (Room 18). The University of Jesgow 12: 800: with whom applications (8 copiest) giving the names and addresses of theo refores a hould be lodged on or before 31st July 1878.

Re-Shape Your Career

South West Essex An international underwear manufacturing and distribution company making girl shaped girls, has to be mindful of the changes in feshion. However, the business foundation of the company is obviously a serious matter, and the development of a European systems network based on a Honeywell 64/30 is going to be a prominent feature in their plans. They require two experienced Systems Analysts to put this network into action.

Senior Systems Analyst

Reporting to the Director of Systems Consultancy, you will study key functional areas

salaries.

Working under the Senior Systems Analyst, you will assist in the study of business problems and implement new systems and improvement plans. You will work closely with other departmental managers and computer users. Aged 26-35, you will have at least 3 years' business systems experience in a manufacturing industry and some O & M or work / method study will be preferred.



Please telephone or write for details to, Graham Besmes or Mayls Webster on Chelmsford (0245) 60234. PER, Cater House, 49 High Street, Chelmsford CM1 1DE.

Applications from both men and women are welcome.

UNIVERSITY LIBRARY LIBRARY AUTOMATION

SENIOR VACANCIES

Two serior vecancies, one on scale £5.506 to £7.782, the other on actale £4.501 to £5.178, for persons one perianced in systems analysis and ordered serior and design and desig minecempu (er experience, woung me despote. Applications to the Librarian, Cam-bridge University Ubrary. West Road Cambridge CB3 90ft, with the names of three refereds by 25 August 1878.

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Knight Computer Services

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Staff Services Divisions or BCC Dausson's Century and a mirrore as of Computing Services Association

ANALYST/PROGRAMMER

(Pay award imminent)

This post ranks second to the Computer Manage The installation comprises an ICL 28K 2903/3 with 3 EDS 30, Magnetic Tape, VDUs, Hard Cor Printers and D.D.E.s. Further enhancements a

For further details of the post, assistance withousing and other benefits, contact the Person Officer or Computer Manager For an applicati form, write to the Personnel Officer, Manor Hous Turners Hill, Cheshunt, Waltham Cross, Herts El 8LE, to be returned before 13th July 1978.

(Grade SO.2 - Maximum £5,692 p.a.)

envisaged. Main language is COBOL and a knowledge of some aspects of Index Sequential Fiorgenisations and handling, GEORGE II/JC Communications, ICL Software and FIND 2. TABN would be advantageous.

Contract Assignments with a minimum £100 p.w. plus expenses.

COMPUTER WEEKLY, June 29, 1978

Vacancies exist in all parts of U.K. For further information contact:-

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We want YOU now for Permanent

Positions at all operational levels,

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(particularly production control/planning and inventory management), analyse business problems and implement improvement plans. You will be supported by another Systems Analyst and finite with departmental managers and computer users. Aged 30-40, you will have at Jesst 5 years business systems experience in a manufacturing industry and preferably a background of some & M or work study/methods analysis.

Systems Analyst

In addition to negotiable salaries, both positions will involve travel in Europe and excellen apportunities to develop your career within the Company.

BOROUGH OF BROXBOURNE

SENIOR SYSTEMS

TEHRAN

DON'T BE SHORT-CHANGED CHECK YOUR PACKAGE AND YOUR CAREER

HIGH TAX FREE SALARIES PLUS FAMILY ACCOMMODATION AND OTHER SUBSTANTIAL BENEFITS

If you have Honeywell 6000 or Level 66 experience and are considering a term in Iran, then here are the best opportunities available. My client is one of the USA's leading Honeywell systems software companies and as such is able to offer the top packages for Tehran.

Consider the following:

TAX FREE SALARY

— A generous tax free cash income of between \$27,920 p.a. and \$33,680 p.a. for personnel with 4-8 years' applications experience. Higher salaries are available for more senior and specialised positions.

ACCOMMODATION

- The company provides a separate apartment for EACH employee, the size of which varies according to the family.
- The company pays for all utilities, e.g. gas, electricity, etc. with the exception of the telephone.
- The company provides a good standard of furnishings for the apartment including television, washing machine, fridge/freezer, etc.

N.B. The company budgets for an average of \$17,000 to cover first year rental and furnishings for EACH apartment.

ADDITIONAL BENEFITS

- -The company provides home to office transportation
- The company pays local school fees for children over 5
 The company pays Medical Insurance
 The company pays emergency home leave where necessary

HOME LEAVE

- The contract is for 18 months' duration and a family trip home is paid for after

JOB CONTENT

The company has been awarded a substantial contract due to its reputation for systems and software development based on Honeywell computers. The scope of this project ensures a high level of job satisfaction.

FUTURE CAREER PROSPECTS

- The company is a well established systems software house and NOT just a bodyshop. Consequently, they view each new appointment as the start of a long term career through an initial assignment in Tehran. In addition to IRAN, future opportunities exist in the USA, UK and EUROPE.

REQUIREMENTS

PROGRAMMER/ANALYSTS

- Minimum of 4 years' good experience in COBOL with applications knowledge.

SYSTEMS PROGRAMMERS

- Around 8 years' experience in DP with extensive knowledge of GCOS, GMAP,

DATABASE SPECIALIST

— Around 8 years experience in DP with extensive knowledge of GCOS, IDS.

TDS and database design. REF RW 24/1

CALL DAVID J. HUTCHINSON ON 01-499 4501 TO DISCUSS

THE BEST OFFER AVAILABLE

CREATIVE **OPPORTUNITIES**

LONDON

JUNIOR & SENIOR

My client currently operates a large twin IBM based bureau, specialising in systems for the advertising industry. They are soon to take delivery of an additional machine, a PDP 11/70 to cater for their expansion programme (future plans include ordering 2 more PDP 11/70's during the next 18 months). Enjoying the financial support of their parent public company, this thrusting young subsidiary employs approximately 60 DP staff. It has good internal communications, with highly visible senior management and practices a "promotion totally on merit" policy. All the current systems are to be redesigned and rewritten to operate in an on-line environment offering a totally integrated package to cope with the needs of the advertising industry. Over 40 advertising agencies are serviced by these administrative and accounting systems.

DEC PROGRAMMERS £4000 - £6000 Basic +

The installation of a large disc based PDP 11/70 and the probability of 2 additional 11/70s in the next 18 months give rise to a heavy development schedule. Very interesting projects are to be undertaken including sophisticated on-line systems for the booking of TV time. The machine will operate under RSTS and use RMS II/K file management system.

JUNIOR Programmers will have the opportunity to develop their skills at a fast pace within a technically advanced environment.

SENIOR Programmers will enjoy significant responsibility in the development of sophisticated systems. All Programmers will gain highly marketable experience within a very attractive company. Both positions require some exposuro to DEC programming.

SPECIALIST MANAGER

This person will be responsible for the generation and maintenance of machine software and the development of PDP applications programs by his team. He will be highly experienced in DEC systems and possess a thorough detail level knowledge of RSTS. This is a superb opportunity for a strong technician to develop his career into management through an interesting and challenging role.

RW 26/3

PROGRAMMER/ANALYSTS IBM DOS COBOL To £6000 pa

In addition two Programmer Analysts are required to design and implement significant enhancements to current systems. This interesting project requires self-reliant young professionals who can enjoy a company atmosphere which encourages them to use their initiative and imagination to the full. The steady pressure of an assured workload will enable you to develop your skills at your own pace. Planned growth will allow the company to accommodate fast

Call DAVID J. HUTCHINSON on 01-499 4501

hutchinson-scoppins recruitment

Grow with Telecomputing - nought to a £million in four years Over 130 users of TPS – the leading software for ICL online systems Over 60 staff working exclusively on the implementation of online systems on the ICL range

Software Design and Support

1900 2900 VME/B VME/K

Telecomputing continues to develop TPS as the outstanding to monitor for the ICL range. We are now planning our new software for VME/B, VME/K, and for intelligent terminals. We got it right with TPS - now is the time to join the small team who will develop and support another

Applications Design and Programming

Our client services teams continue to expand to meet the growing demand for our software product and project services. We need more experienced programmers and systems analysts/ designers. Junior vacancies require at least one year ICL Cobol experience; in more senior positions your specific computer background is less important. All our work is for online systems

but you can learn that after you join us. Our teams have already implemented applications auch as order entry systems, production engineering, stock controls and mail order. More are in the pipeline. There are opportunities at all levels. Continuous training will develop your skills and promote your career growth.

Software Sales

To self TPS -- the leading software product for ICL communications systems. We are currently taking one order every three working days and need additional Sales Staff to respond to the tremendous demand for TPS and other Telecomputing quality software products. Computer experience and sales motivation are essential; experience of terminal systems and of software marketing are useful but not mandatory.

ideally we would like to meet system designers and programmers who have either moved or wish to move into sales.

Project Managers and Consultants

Must have extensive experience in the design and development of online transaction processing systems.

relecomputing specialises in implementing advanced systems using communications terminals. We operate internationally with every client bringing his own unique system requirements and we need the senior staff to design and develop those systems.

Online Systems & Software

ecomputing

Oxford, London, Manchester, Amsterdam

Lecturer (Commercial D.P.)

To join a small team providing formal training to our clients. We require an established lecturer in computer disciplines or experienced computer programmer with lecturing skills and strong

training motivation. You will not spend all your time lecturing. You will have the opportunity to keep abreast of the latest developments by spending part of your time working with the applications, design and programming staff.

Technical Writer

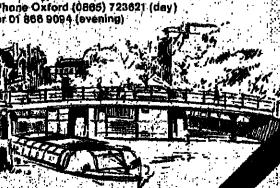
Responsible for writing, publishing and updating our systems and software publications for TPS online systems; i.e. manuals and builetins covering systems design, programming, system creation and operating. We require an experienced computer technical writer or an experienced analyst/programmer with the writing skills and motivation to produce quality publications for

Telecomputing started in Oxford in 1974 and has more than doubled in size each year. We are now providing advisory, training and implementation services for installing online computer systems eround the world.

We have our own 2904 and a 2950 on order. Our activities are continuing to expand and we shall soon announce a microcomputer display terminal. This year we shall double in size egain.

When you join Telecomputing you are taking the opportunity to develop your own career in a growth company. We have an informal atmosphere and expect to pay attractive salaries and

Please write of phone; TELECOMPUTING West Way, Oxford OX2 0ED r 01 866 9094 (evening



Salta e de la cama de la composition della compo

COMPUTER WEEKLY, June 29, 1978

Software Design & Development

Move your career into the 1980's. But do it in 1978.

Our clients are among the world's major investors in research and development.

With headquarters in the USA, they are currently designing and developing the communication systems of the future, using sophisticated software and the most modern hardware available, including main frames, minis

TWO ESSENTIAL QUALIFICATIONS

We are seeking candidates with a good first degree or postgraduate qualification in Computer Science or Electrical Engineering/Mathematics/ Physics with Computer Science as an ingredient. Your experience may have been gained in any environment involving the specification, design and testing of software for real-time systems, and whilst experience related to advanced

In the USA

telecommunications technology would be an advantage, it is not essential. There are also positions available for candidates with an interest in Advanced Systems Research and Planning.

THE REWARDS

As a successful candidate you will move ahead in terms of income, life-style, career progression and experience. Above all, you will enjoy the satisfaction of working in a company which recognises the vital importance of systems innovation to future business success: an attitude which is amply reflected in the back-up and rewards the company can offer.

RANGE OF OPPORTUNITIES

Our clients' offices are situated on the outskirts of a major city with easy access to countryside and lakes. Relocation costs and immigration formalities will be looked after by the company.

We would like to discuss with you the range of opportunities available – opportunities which will enhance your experience, develop your career prospects and increase your earning

As an initial step, send brief career details or write or telephone for full details and an application form to: Euroselection, 6-8 Emerald Street, London WCIN 3QA or for an informal discussion telephone Barry Eagles on Brighton (0273) 601699. Your enquiry will be treated in the strictest

]euroselection[Management Consultants

SPL's subsidiary in the Netherlands continues to grow fast and now needs more Computer Professionals.

We need

*A minimum of 2 years programming experience

* a good working knowledge of any major international mini-computer such as DEC PDP11 or Data General Nova.

* Practical experience of systems software work on any small computing equipment particularly in the areas of I/O handling, disc monitors, assemblers or high level language compilers

* Experience of industrial systems applications based on mini or micro computers

The total salary package will be very attractive to people at present working in the U.K. and will be in the range of £10,000 to £12,000 upwards Applications from Dutch Nationals and others working outside the U.K. will be welcome."

If your experience does not fit these requirements but you are interested in opportunities or working overseas with a major British software house please contact us anyway.

Please write or phone:

Alan Taylor, Resources Manager SPL International

12-14 Windmill Street, London WIP 1HF 01-636 7833 or phone direct Ulrecht 315534

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ICOMPUTER SERVICES..

COMPUTER SERVICES... CWS Computer Group



Manchester Based c. £9,500

CWS Computer Services satisfies the total data processing needs of the £1,400 million turnover Co-operative Wholesale Society Limited and in addition provides computer services to Co-operative Retail Societies and other commercial organisations through its six regional Computer Service Centres.

Due to expansion and reorganisation a Mahager is required to take charge of the six regional centres and to further expand and develop the business.

An extensive knowledge of the technical and commercial sepacts of the computer service industry with a blas towards sales and marketing are essential pre-requisites for applicants. Over and above this nowever, the man or woman appointed will be pre-requisites for applicants, Uyer and above this however, the man or woman appointed will be required to demonstrate a successful record of management achievement against a background of rapid growth and technological change.

The Group operates ICL maintrames throughout its network comprising both 1900 and 2904 systems. A triple 2960 configuration is scheduled for delivery during 1979 at the Group Head Office in Manchester.

An attractive salary in the region of the figure quoted will be offered plus the usual fringe benefits expected of a leading National Organisation.

Confect: P. J. Cropper, General Manager, CWS Computer Services, New Century House, Manchester, M60 4ES, Tel: 061-834 1212 ext. 6820 (office hours) 062-583 789 (evenings).



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162 Walton Road CWS Computer Services Liverpool L4 48 A Tel: 051-207 0457

CWS Computer Services 22 Abbey Street Nuneaton: Warwickshire CV11 5B7 Tel: 0682 384107

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Tel: 0632 406321

CWS Computer Services 100 Morrison Street Glasgow G5 8LP Tel: 041-429-2100

Crabba Street

lpswich Suffolk IP4 5HT

Tel: 0473 78616

CWS Computer Services Drum Road Barley Mow CWS Computer Services Stratford House, Station Road Surrey GU7 1HH Tel: 048 68 28212/3



No profession is changing as fast as computing. That means exciting career opportunities. But it can also mean problems — for those whose careers fail to develop as fast as the technology.

Data Logic operates at the forefront of computing, applying the very latest hardware and techniques to practical commercial problems. We cover the range from mainframes to the smallest computers. We are leaders in the use of microprocessors for applications that not so long ago required far larger machines. Several of our projects involve dispersed networks of ten or more minicomputers

The exceptional scope of work is important to our staff. We can match their individual experience to their

projects. Equally, we can ensure that each project adds to their experience. As computing itself develops, so do they.

Over the past year Data Logic has grown from 120 professionals to today's total of 280. Our expansion has meant unrivalled opportunities for career progression. We are not prepared to promote people before they are ready for it. But when they are ready — and we give all the assistance we can — they know that the positions as senior programmer, senior analyst, project manager and consultant will be there waiting for them.

In short, people at Data Logic have some of the most satisfying work you can find. And the extra satisfaction of learning as they do it.

Project Managers

For mainframe, minicomputer and mixed processor systems, usually aupporting terminal networks. Increasingly, Data Logic's turnkey projects involve multiple, separated

Applicants must have at least 5 ears implementation experience. They must have managed a sizeable project or have taken substantial

Database Consultants

To advise clients on the creation or upgrade of databases and to assist Data Logic teams in the design of retrieval systems. Projects will involve both mainframe and standalone minicomputer configurations.
Applicants should have

experience in the design of record experience in the design of record structures and have used at least one of the leading database packages such as ADABAS, IMS, TOTAL and DMS/2. Knowledge of banking or insurance is of particular interest.

Senior 2900 System Designer

For consultancy and implementation projects, with a bias towards large ICL 2900 models. Applications will include database systems and communications networks. Extensive knowledge is required of hardware capability, operating systems and standard software. The scope for application of this knowledge and for career progression will be considerable.

Minicomputer System Designer

For work at the forefront of the commercial application of small computers. The majority of projects will involve data commu and several systems now in their early stages include many nterconnected processors.

Applicants should have at least 3

years design experience, preferably including system sizing and

Scientific/ **Mathematical Programmers**

Principally for real time minicomputer systems applied to analysis and/or control in scientific environments. There may also be some problem solving in high level language on mainframes. Applicants should have a relevant degree in the mathematical sciences and one or more years practical experience in assembler FORTRAN.

Applicants should have 3-5 years analysis and programming experience. A sound knowledge of CICS will be an added advantage. Digital Engineer/

For mainframe projects involving a variety of interesting and demanding applications, including

banking, însurance, manufacturing and distribution.

COBOL and

PL/1 Analysts

Programmers For design and development of devices such as interfaces and terminals, with an emphasis on the

use of microprocessors. Applicants should have a degree in electronics or computer science and have programmed mini or micro. microcode level.

Programmers -Small Commercial Systems

For Implementation of transaction systems on a variety of minicomputers, ideally, candidates should have experience of RPG1. BASIC, COBOL or FORTRAN applied in a commercial

Most vacancies exist in our offices in Greenford, Central London, Birmingham and Manchester. Telephone or write, indicating the positions of interest:

For Greenford and Central London, to: W. O. Barrow
Data Logic Limited
FREEPOST, Westway House
320 Ruislip Road East
Greenford ilddlesex US6.8BR Tel: 01-578 9111

For the Midlands; to: A. W. Taylor Data Logic Limited FREEPOST Bitmingham Rouse Bitminghem B2 4BR Tel: 021-832 6535

For the North, to: J. Angerson Data Logio Limited Warwick Road Warwick Road Stretford Manchester Tel: 081-872 3232

For mainirame assignments we are seeking knowledge of IBM 370, ICL 2900 and 1900 series, Burroughs B6700 and B3800, and Honeywell H6000.

For minicomputer projects, knowledge of Data General or DEC machines is preferred, elthough a background with any other leading make of small computer is of

Data Logic offers four weeks annual leave, free insurance

and a contributory pension scheme. Cars are provided for senior staff. Salaries are excellent and all staff share in company profits. Per capita we are probably the most profitable software company in the country.

WIYKIAD **APPOINTMENTS** LIMITED

Computer Personnel Consultants

SENIOR

COMPUTER

OPERATOR

With Large

Systems

Experience

We are a Southempton based company which operates a worldwide through container shipping service on behalf of five major shipping lines.

Recently we have installed a 86700 computer with an on-line Database system to supplement our existing Hansywell 2060.

We now require a Senior Operator to work with both of

If the challenge of such a position appeals, and you have obtained a couple of years large systems experience, preferably with Burroughs equipment, we should like to hear from you.

The post offers an attractive salary plus excellent fringe benefits. In addition relocation expenses will be given where

ext 3306

Pel: Southampten (0703) 34433

Please write or telephone for an application form to:

SYSTEMS ANALYST

LONDON

To £7500

A systems analyst with sound experience in commercial systems design and a desire to A systems analyst with sound experience in commercial systems design and a desire to progress towards project leadership is required to augment an active data processing team. Candidates will be used to functioning in a project team environment and working to good standards. They should feel confident enough to take control of a small team and a total system, a programming background is not essential but would be an advantage. The ability to satisfies and research as a system and clearly are establish good working relationships with users and to communicate simply and clearly are more important factors of the job description.

The successful applicant will work on unusual and interesting applications utilising some of the most advanced techniques. A full training programme operates and is available to all

employees. In addition to a competitive salary the company are able to offer a comprehensive package of

Ref. E1/2906

PROGRAMMING PROFESSIONALS WEST LONDON £5000-£7000 **IBM 370**

As a leading concern in their field our clients' commitment to data processing has been well-established over a number of years. They are now seeking to extend their use of existing hardware by developing a number of new systems using sophisticated techniques. They therefore require additional staff to join a technically advanced programming department, and

play an active role in the company's future growth.

Transaction Processing and Database Management are just two of the fields in which successful applicants will be involved. Ideally they will have some relevant experience in these areas already and be seaking to enhance their technical knowledge whilst making a move which can provide long-term opportunities.

Applicants who can offer from two years' experience upwards, programming in an IBM 370 installation, using COBOL or PL/1 will be rewarded with an excellent commencing salary and a valuable range of frings benefits.

PROGRAMMERS

To £5250

Our Client, a busy engineering company, is currently developing several on-line real-time

SLOUGH

- ★ To receive training in advanced IBM software
 ★ Develop COBOL programs involving database and TP systems Work on a variety of applications projects
- Five weeks' holiday a year
- Excellent starting salary and conditions of employment

* To join an active sports and social club

--and you have a minimum of 12 months' COBOL programming experience, then this could be a good opportunity to accelerate your career.

Ref. W1/2906

PROGRESSIVE ANALYST/PROGRAMMERS HERTS./MIDDX. BORDER £4750-£6250

Our client, part of a large manufacturing organisation, is seeking progressive D.P. professionals to match their own exciting expansion plans.

With the impending installation of the company's upgraded mainframe, the extra capacity is

scheduled to cater for new systems development.

The opportunity therefore exists for career minded programmer/analysts to gain extensive analytical experience in a variety of commercial applications. The persons appointed will be involved in system investigation and will be expected to develop projects into a real-time

Realising the importance of securing suitable candidates to join a professional team, the company offers competitive salaries, progressive career structures, four weeks' holiday, sports and social facilities and many other attractive staff benefits.

24-hour answering service Please telephone for a confidential discussion or write to: 30 Fleet Street London EC4Y IAA **01-353 098**1.

PROGRAMMER

GERMANY

months' contract in Dusseldorf, excellent

CITY OF BIRMINGHAM POLYTECHNIC The following vacancy exists in the Computer Centre which operates an ICL 19025 (32K), and is proposing to install other

SENIOR PROGRAMMER 63368,63702 + supplements of £312 + 5% (mex. £206.58)

Abraxas Recruitment Division

SHIFT LEADER

A pundrum which will outful a groat dopt of suspensibility. Suitable applicants will have an excellent ICL Large configuration of all pundrup of LECRGL III Macros. Supervision of six operators on shift will be required. Large configuration and signify unpraising.

SENIOR OPERATOR

r videal uppertunity for an experienced operator to progress in a highly professional opera unites' plus a sperionicu on IRM 370 using OS/VS1 will be rewarded by an excellent astar ue Life Avairrancu, subsidised migals, and car allowance

OPERATOR

CITY

1BM .170 DOS/GHASP/VS Three shift system Suitable applicants will have a minimum of 18 months' experience and will be glood communicators. They will enjoy the first-class benefits associated with working for a company that sets high standards including. Mortgage subsidy, LVs, BUPA and Sports facilities.

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Contact: Jim Baker JAMES BAKER ASSOCIATES International Personnel Consultants 16 Maddox Street, London W1. Tel: 01-491 4478.

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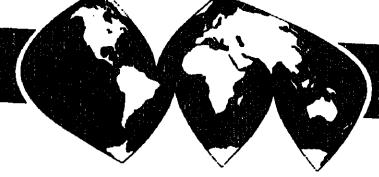
A working knowledge of al least two languages and experience of Educational Computing would be an advantage: Candidates, male of fatnale, hery obtain application forms (returnable by 7th July 78) and further details from The Personnel Officer, City of Birmingham Polytechnic, F. Block, Perry Barr, Birmingham 842, 25U, Please quote ral, AS/P/198, Canvassing will discussitive.

REAL TIME MINI

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PROCESS CONTROL

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Systems Engineers

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RACAL MILGO, a member of the world famous Racal Electronics Group, is a leader in data transmission techniques, and is now to broaden its activities by creating a NEW DIVISION to market COMPUTER CONTROLLED VOICE RESPONSE SYSTEMS, for data entry and file enquiry applications

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The person we seek will have a broad background which may include systems or design experience in minicomputing in communications, data entry retrieval systems or intelligent terminals Experience with PDP 11 would be an advantage.

He she will interface with the Californial-based equipment supplier, and provide the necessary technical expertise on systems and product hardware to the Company and its network of foreign distributors, involving some foreign

travel for short periods.
Together with the head of systems software, the selected candidate will direct and support a learn of systems engineers. To provide a complete user system facility. Probably aged 30 years and upwards, with a good degree, a strong practical ability, a self starting approach and the ability to communicate are essential qualities.

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The position requires reasonably broad experience, which may include applications programming for batch and real time applications, data entry file enquiry systems, or minicomputing in communications. Experience with PDP 11 would be an advantage.

He she will interface with the California based equipment supplier, and provide the necessary expertise on the software aspects of systems and terminals.

The selected candidate will also have overall responsibility with the Chief Engineer (Chiefware) for the condain count support of a form of Systems Engagery, and interface with a sub-contract software house. Providing quickages for nelwork of foreign distributors, involving some foreign travel for short periods

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To sell these systems, two experienced sales executives of proven ability are sought for the South and North of

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Probably aged late 20 s, they will have a good practical ability, a mature attitude and be able to communicate with customers, software houses, and field service staff

The NEW DIVISION will be saturated to Recading (Recks, and the altractive total regioneration package will refer title significance of these key appointments

Please write giving details of experience, qualifications and present salary to The Personnel Officer, RACAL MILGO LIMITED, Prospect House, Thorn Street, Reading Berks

University of Essex

DEC system-10

Systems Programmer

in the Department of Computer Science' Computing Service

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Selecy on scale 23.660 to 68.178 plus standard medical from Assistant Registration (Education). University of Symandylam, (D.66.363, Blumingham, (D.66.363, Blumingham, 17.66, and physications (10.46) and physical from the standard physical physic



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Science

Applications are invited at Principal Lecturar, Sensor Lecturer and Lecturer levels for the Department of Computing Science at the Hong Kong Polytechnic The Department offers courser feating to a Department of the Computing Studies, a Higher Diploma in Computing Studies and a Higher Diploma in Systems Analysis. A Hipposette after mine advanced work leading to an Associateship in Computing Studies is now under consideration.

The Department's own courses are, at present commercially oriented and emphasis is placed on practical work Students are required to part of their course, in addition to undertaking projects and care study credit-unit system.

The Polytochnic shares computer facilities with the 2 local Universities Substantial batch projecting facilities are available at all 3 institutions and present developments will facilities the sharing of resources. In Polytochnic's compusitions, and it is planned that this figure will rise to approximately 300 by 1930/81.

Successful applicants will have expense in one or more of mis (dilawing areas. Advanced COBQL, Advanced Systems Analysis, Systems Programming, Real Tune Systems, Project Management and Control Date Base Management Systems, Advanced Management Information Systems and Computer Organisation General Qualification for Appointment

Principal Leaturer: (a) a degree or professional qualifications, and (b) an advanced specialist qualification or extensive experience in a sciplised field, and \$1) substantial teaching and industrial / comparising; and (d) proven administrative ability

Senior Lecturer: (a) a degree or professional qualifications, plus preferably an advances specialist qualification, and (b) at least tive years industrial commercial experience, and (c) authorated searching and for proven administrative spility.

Lectures: (a) is degree or professional queblications or at teast a Higher Technician qualification in the appropriate field of study, and (b) at least three years teaching experience or a suitable combination of professional and teaching experience or a suitable combination of professional and teaching experience.

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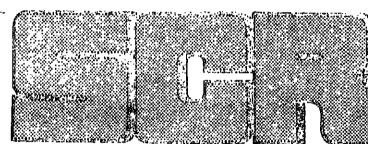
- * a minimum of 4 years' programming experience with a fluency in COBOL/JCL
- * an analysis background, which should have included some involvement with the design and implementation of
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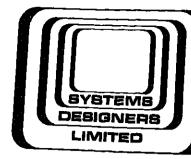
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COMPUTER WEEKLY, June 29, 1978

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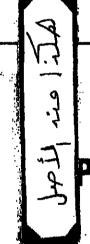
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variety of computers.
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systems software.

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DEC PDP II DG Nova/Eclipse H.P. 3000

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THE SALES BIT

COMPUTER WEEKLY, June 29, 1978

How to keep a good relationship with the staff

ONE of the most difficult One of the most common problems for a sales circumstances in which res new to the job, is estabhimself with "lightweights" or should he have a team of aggressive "high-flyors" fact of life that any form of and operate in a democratic style? It all depends set a man apart from other

people hassiesi
Of course, a sales
manager seldom finds him-

man's poison.

To sustain personal credibility with his salesmen, a manager must mers lobby the directors, operate in a style which and the salesmen reveal comes naturally rather than their sexual deprivation. No contrived; one which is matter how Bacchanalian within the bounds of his the Yuletide orgy, a capability in physical, manager has to remember emotional and technical that come January 2, he

Anything else is an in-vitation to failure. Salesmen enable him to hold the resare very good at identifying, pect of his team.

potential weakness in their

On the other hand, a sales

affected by many factors: less destructive kind. The the size and nature of the man/manager relationship the size and nature of the sales team; the duration of the solling-cycle; the maturity and experience of the salesmen; the personality of the manager, and so on.

Having accepted the starting point of "To thine own-self be true," the next is at the social level; mostly step for the sales manager in the social level; mostly step for the sales manager.

step for the sales manager it is in the field and in the to consider is the nature of office. The same rules apply.

volume products with a long selling cycle, demanding sustained effort on a team basis, without regular manifestations of sales success, a totalitarian style seldom works affectively.

Of the image his actions and attitudes create. It is so easy for real skill and humanity to be obliterated by an unfortunate manner, and lack of consideration to personal presentation. dom works effectively.

selling-cycle/low value pro-ducts; particularly where a I keep meaning to put large salesforce is involved, quotation on my office wall: demand an "up front" style "Oh God give us the of leadership and a firm strength to see ourselves as control of performance. De-others see us." It must be mocracy and altruism are Burns - I read it on the back often seen as weaknesses in of a matchbox.

Having said all that, few of these extremes of personal style and selling en vironments apply in absolute terms. There is always a need to "trade-off" one SINCE the climber walk various circumstances, in various circumstances, in tance travelled is simply which they have to interact. $(44 \times 14) + (14 \times 44)$. It must at all times be conwhich equals 13% miles. sistent in business and

esulting in real success, for both partles. Above all the sales manager must hold the respect of his men. This cannot be generated by simply

social terms if a credible

manager, particularly one pect becomes tarnished through inconsistency, is lishing a balanced the drink-after-work syn-relationship between his drome. It does not make any subordinates and himself. sense at all for a sales Should he take an auto-cratic stance and surround both a mentor and "one-ofthe-boys."

whether you prefer quota-performance hassies to people hassies! be exemplary. This is un-likely to be achieved by out-drinking, out-swearing self starting from scratch and, therefore, his team has effectively been chosen for ruined evening meal and the him. As far-as management style is concerned, it is not really a question of choice. One man's meat is another

needs to have preserved

superior, and pretence manager who totally rarely makes good cover. Isolates himself from his rarely makes good cover.

The nature of this man/
manager relationship is blems of a different, and no

the selling environment. The manager must be aware
In the case of high of the image his actions and

. Having said that, one has There is too much "living to realise that the most diftogether too long" for a ficult thing in the world is to be objective about oneself, be generally acceptable.

On the other hand, short mentor, for "the onlower to the case of the

'ns — I read it on the bac

Puzzle answer

against the other. This is, downhill three times as fas particularly true of the as he walks up, the "times relationship between the taken" must also be in the sales manager and his sa- same ratio-41/1 hours up learnen in the context of the and 1% hours down. So dis-

understanding is to exist New Office

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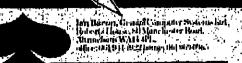
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The industrial systems division of Gemini is an acknowledged leader in the field of feal-time control applications utilizing Mini and Micro-Computer Systems, The division, as an integral part of Cap-Gemini-Sogett, one of the world's largest software organizations, is well placed to offer its wide range of services to an ever-increasing expanding market.

As demands for these services continus to increase they require more professional staff with knowledge of process control, communications military and diagnostic software. Familiarity with an Assembler language, Corél, RTL/2, Fortran or Basic would be useful, experience of general computing applications is essential.

In addition to basic salary Gemini offers a substantial profit related annual bonus, free life health and accident insurance schemes, a: minimum of four weeks' annual holiday plus generous allowances while working on clients' sites in the UK and Europe. Re-location assistance will be offered where appropriate.



GEMINI Recruitment

MANCHESTER SALARIES £4100 - £7500

ANALYST PROGRAMMERS. PL1 with real-time experience (software

SYSTEMS ANALYSTS. IBM Assembler preferably LEAD PROGRAMMER. PL1 with Adabas or CICS.
CONSULTANT MARKETING MANAGER, 1900/2900 experience

ANALYST PROGRAMMER. Cobol/CICS.
PROGRAMMER DESIGNER. PL1 with Adalas or CICS.

PROGRAMMERS. 2 years' Cobol, any machino. PROGRAMMERS. 1900, Cobol, Plan.

ANALYSTS. 1900, design experience.
COMPUTER OPERATORS. George III experience (three shift system).

LEEDS

SALARIES £4800 - £6500

SENIOR SYSTEMS DESIGNERS. Commercial Cobol, preferably (BM. SYSTEMS DESIGNERS. Commercial applications Cobol. SYSTEMS PROGRAMMER. IBM Assembler. PROGRAMMERS. 1900 Cobol. PROGRAMMERS. 370 Cobol, CICS.
ANALYSTS PROGRAMMERS. Cobol/PL1 with CICS.

SHEFFIELD SALARIES £4000-£6500

ANALYST PROGRAMMERS, PL1/Cobol with CICS. ANALYSTS. Engineering background with Cobol. PROGRAMMERS. Univac Cobol. DATA BASE DESIGNERS. Commercial data base experience.
TRAINEE ANALYSTS. Good commercial Cobol background.

HULL **SALARIES £4800 - £6000**

PROJECT LEADER, Accounting systems experience.
SYSTEMS DESIGN. Systems Analysts and Cobol experience.
SENIOR PROGRAMMERS. 1900, 2-3 years' Cobol. PROGRAMMERS. Two years' Cobol. ANALYSTS. ICL Commercial Systems background

PRESTON SALARIES £3700 ~ £5500

SYSTEMS PROGRAMMER. George III Plan SYSTEMS ANALYSTS. Commercial 1900 applications experience PROGRAMMERS. 1900 Cobel.

OTHER LOCATIONS

NOTTINGHAM, PROJECT LEADER. Manager PDP with transports tion experience to £8500.
BRISTOL. DEC APPLICATIONS PROGRAMMER AND OEM SALESMEN. Selary negatiable. CHESHIRE. SYSTEMS PROGRAMMER, 370 Assembler Experience

EDINBURGH, IBM Cobol or Assembler PROGRAM MERS. £6000.

CURRENT CONTRACT REQUIREMENTS

PROGRAMMERS, IBM Cobol DOS or OS with CICS. Yorkshire.
PROGRAMMERS, Plan Cobol with George III. Manchester.
PROGRAMMER/ANALYST. 1900 Cobol with Driver. Manchester.
PROGRAMMER. 3 years + Fortran. South Manchester.
PROGRAMMERS. Univac Cobol. Manchester.
PROGRAMMER/ANALYSTS. PL/1 and Mark IV with DL/1. Langables.

PROGRAMMER. Burroughs Cobol. Humbe

PROGRAMMER. Burroughs Coool. Humberside.
PROGRAMMERS, PL/1 with IMS. Manchester/Midlands.
PROGRAMMER. PDP 1.1 Assembler. Manchester.
PROGRAMMERS. Coral 66 (single status). Numerous oversess.
PROGRAMMERS/ANALYSTS. PL/1 and Cobol with CICS. Geneva/



Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth Block 4 (His Head On The Chopping Block)

Hex and Cleo have escaped from their captors and stumbled upon a secret hiding place high up in the Sierra Nueva. Meanwhlle, back at Sprocket's Hole, there are signs of life.

DAVY Sprocket opened one bloodshot eye. The light hurt. He closed it again. His head was throbbing. A hammer He closed it again. His head was throoping. A nammer seemed to be pummelling from side to side repeatedly within his skull as if his head had become a giant alarm clock that he couldn't switch off. He tried opening both his

"Oh God!" he groaned, as the walls of the hut swam into

"Oh God!" he groaned, as the walls of the hut swam into focus then blurred again. He stood up, every joint creaking audibly, and tottered out through the open doorway. Once outside he bent double and vomitted violently into the sand. This afforded him some slight relief. He was able to pull himself together sufficiently to inspect his internal errorlog file. It had overflowed after 4,096 entries but there was enough information left to paint a pretty dismal picture of the night before — one "seek fail: re-try" trace after another. His spindles had got completely out of alignment; and it showed. Not only that, spurious index records had proliferated so chaotically throughout his filestore that all the overflow buckets in his master directory were full: his entire memory organisation was in imminent danger of entire memory organisation was in imminent danger of collapse. It seemed that a fault had developed in the virtual address mapping hardware. Only the root segment was unscathed. No wonder he couldn't think straight

"Oh God!" he moaned again, and, carrying his head like an infinitely precious but fragile work of art, he stumbled back into the hut. After the glare outdoors the dimmer light inside came as a relief. He was able to make out Bootstrap's body, sprawled awkwardly under the table, Suddenly it all came back to him. The guns. The

Suddenly it all came back to him. The guns. The prisoners. They had gone, "What's going on here?" he called out. "Goddamn it, Bootstrap, get your back-end out from under there!" He shook his partner as hard as he could, but Bootstrap remained oblivious to all sensory input. He had dropped out of real time.

"Cleo!" bellowed Sprocket. There was no reply.

Then he remembered Kludge's appointment. Galvanised by fear, he sprang to the window. He could see no sign of anyone coming. According to the digital clock it was 0.1000E+02 precisely. That meant Kludge and his team were already late by over half an hour, which was lucky for



him. He bent down and shook Bootstrap once more, without getting any response.

He was not fully aware that to be caught empty-handed by Kludge having let their prisoners escape meant, essentially, the scrap heap. There was nowhere lower to sink than this deserted outpost. He would simply be recycled. Even sweeping the punch room floor would be too good for him after a blunder like this. Desperately he tried to think of some way out. His brows furrowed, in concentration. "Got it!" His fist pounded the table.

If he could persuade them that Cleo and the Kid had been sprung by overwhelmingly superior forces, there was a slim chance that they might get away with it. Busily he began

ransacking the room, overturning the table, smashing the legs off chairs and hurling furniture through the window. He was almost enjoying himself. When he got to the teletype, standing useless in its corner, he pushed it over and leapt up and down on it yelling, "You dumb terminal!" in an attempt to deform its metal casing. But he scarcely

So engrossed was he in this wholesale vandalism that, amidst the noise of breaking glass, he failed to notice the arrival of three interested spectators who stood just outside the door staring at his bizarre activities. At last he stood knee deep in wreckage and could breathe a sigh of satis-"Now all we need to do is tie ourselves up with some rope

to make it look really convincing," he said, turning to look

"You can spare yourself the trouble," said one of the visitors, holding out a pair of handcuffs.

Sprocket gasped. He found himself face to face with Inspector Extracode. Behind Extracode was the redoubtable Commander Kludge, flanked by yet a third inportant looking robot.

Extracode stepped forward and slipped the handcuffs

crisply over his wrists.
"I can explain . . ." began a deflated Sprocket.
"Save your explanations for the trial," interrupted Kludge. "Just tell us one thing: where are Hex and the girl?"

"Well," began Sprocket again, but he never finished the sentence. Worn out by his manic exertions, his memory befuddled by Cleo's random quadratic rehashing, and with no possibility of connection to the Network for a storage regeneration, he finally succumbed to the onslaught of semantic overload. His eyes glazed over.

"Abnormal job termination," he said in a flat voice.
"Processor queue is being reloaded. Please re-submit

input."
"Switch him off," ordered Kludge curtly. "He can be of no further use to us. We'll learn nothing here. Our journey has "What about the one under the table?" asked Extracode.

'If we can revive him he may tell us something."

"Let them both rot," replied Kludge, and strode imperiously from the room, his two assistants in train.

is this the post mortem dump for Sheriff Sprocket and his deputy? Be prepared for a change of scene in our next issue. 4 1978, Richard Forsyth, RAIR Timesharing.

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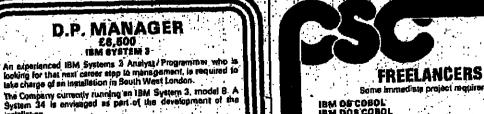
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